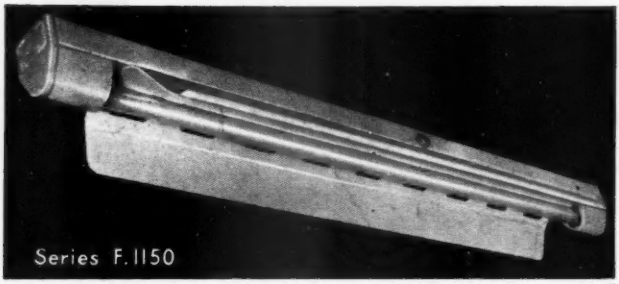
ELECTRICAL TIMES

THURSDAY
24 MAY
1951
SIXPENCE

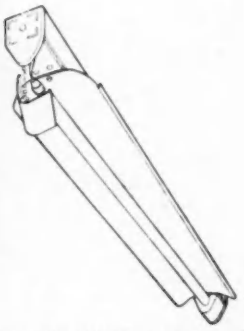


New Mazda Fittings with unique design—simple, sturdy and efficient

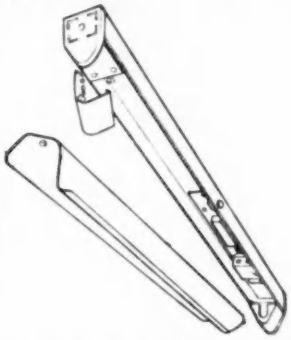
Note these outstanding features :—

- Fittings of robust sheet steel construction, bonderised to prevent rust.
- Covers conceal lamp ends and support the lamp without spring clips.
- Reflector gives 20° cut-off and can be supplied with upward light slots.
- Provision is made for chain, conduit or ceiling mounting.
- Embossed ends interlock when fittings are mounted in continuous line.
- New type of BTH Choke gives virtually silent operation and has no filling.

Available for single and twin 5 ft. lamps.



FOR IMMEDIATE access to lamp-holders, slide end-covers towards centre of fitting. End-covers will then come away.



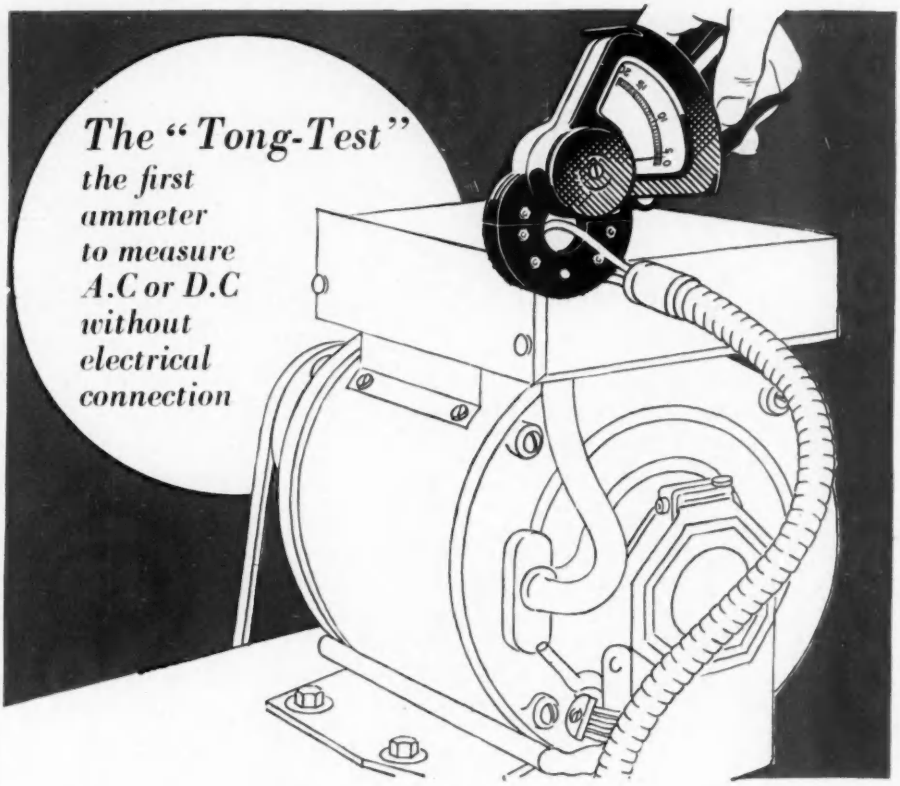
TO REMOVE reflector for access to lamp auxiliary gear, loosen single captive knurled screw at one end of the fitting and slide reflector out from the other.

**Write for descriptive leaflet No. 9613-1*

For leadership in lighting say Mazda!

THE BRITISH THOMSON-HOUSTON CO. LTD., Crown House, Aldwych, London, W.C.2.
(Member of the A.E.I. Group of Companies)

M.4335



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An Alkaline cell you can inspect at a GLANCE!

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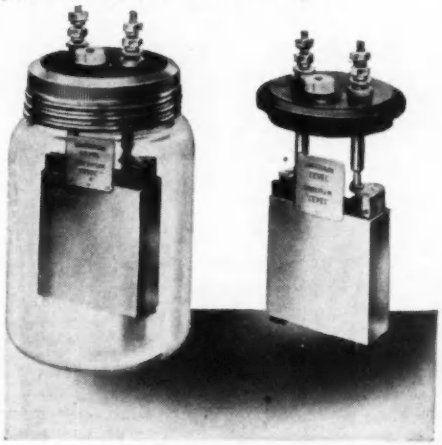
Accidental breakages quickly and easily replaced because of the screw cap.



Unequalled reliability. The Nife can withstand considerable overcharging. This cuts out a common cause of battery failure.

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These new cells have all the special qualities which have made Nife nickel cadmium accumulators famous: extremely long life— great mechanical strength—freedom from self-discharge — no special battery room required.

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GLASS CELL BATTERY

N.B. Nife Batteries are not yet available for private cars or domestic radio.

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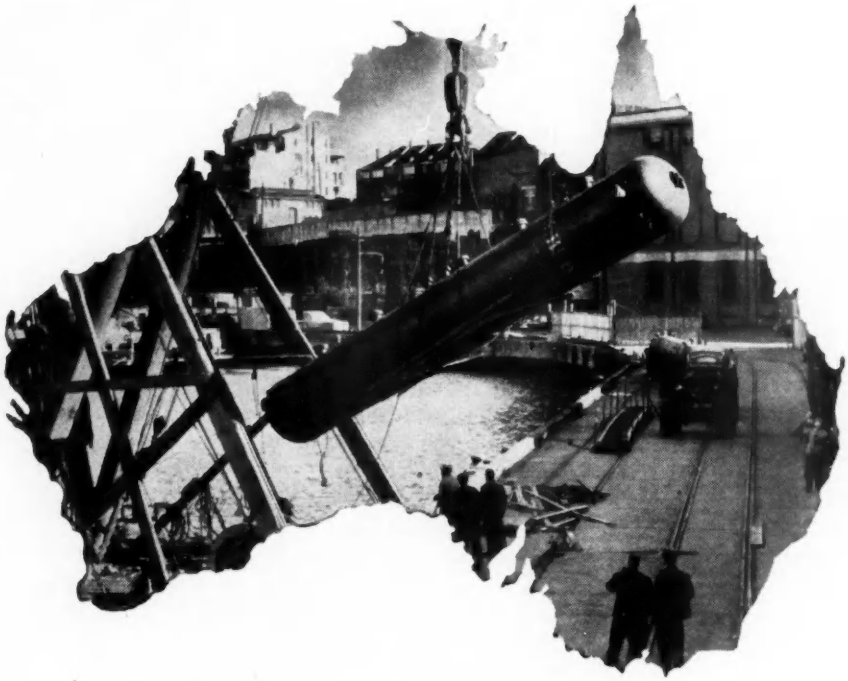
Going up . . .



down under

Steam-raising plant by Simon-Carves is helping to meet Australia's need for more electric power. The photograph shows a solid-forged boiler drum being unshipped in Sydney for the Bunnerong power station extensions, for which Simon-Carves are building two pulverised fuel fired boilers, electrostatic precipitators, coal, ash and dust handling plant, and a reinforced concrete chimney. The new Tallawarra power station in New South Wales is also being equipped with complete steam-raising plant by Simon-Carves

Steam power by **Simon-Carves Ltd** SIMON CARVES GROUP

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S.C. 24

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Wired throughout with

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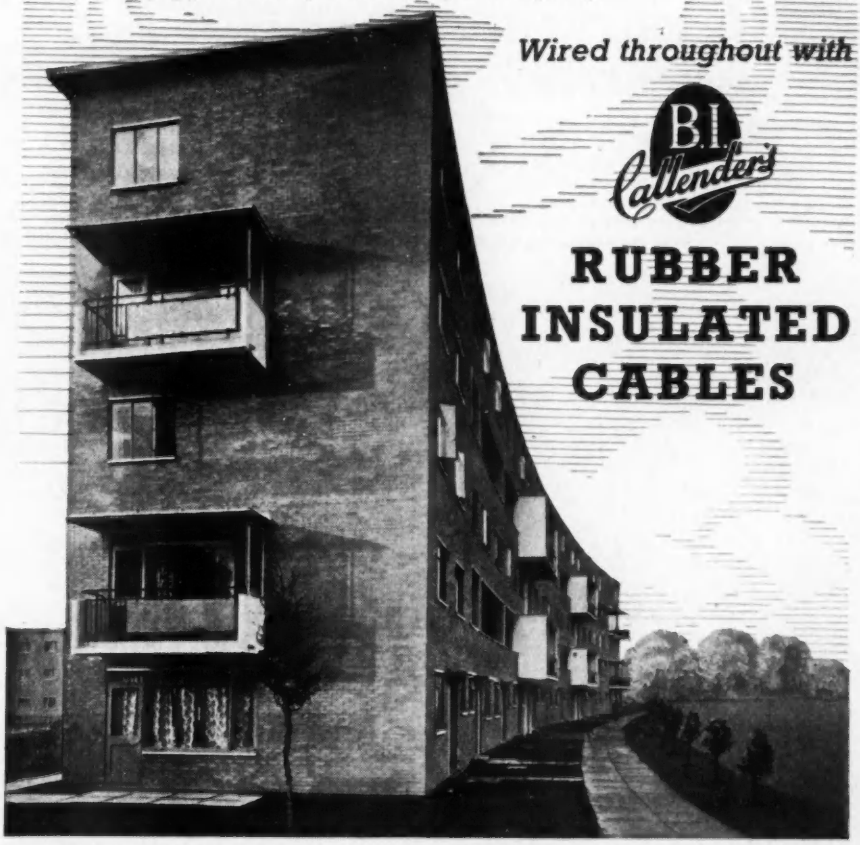

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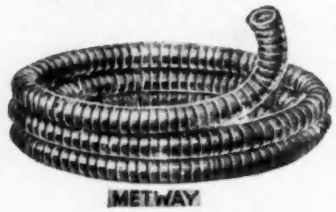

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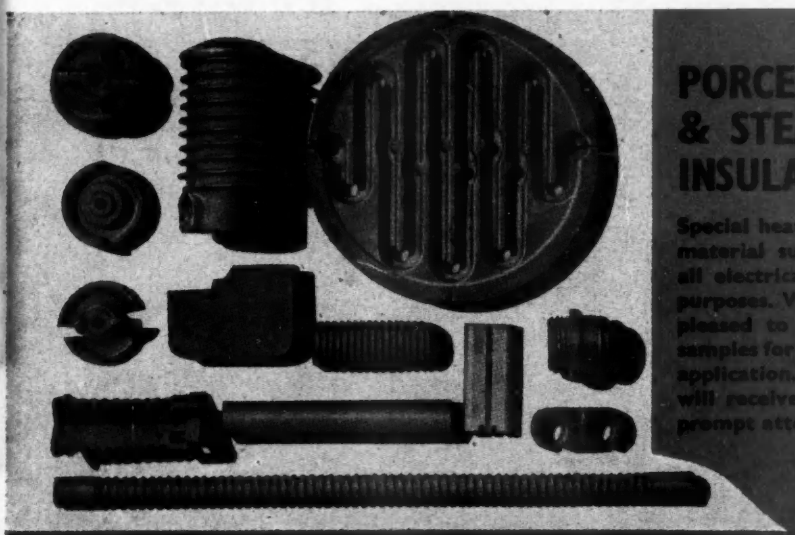

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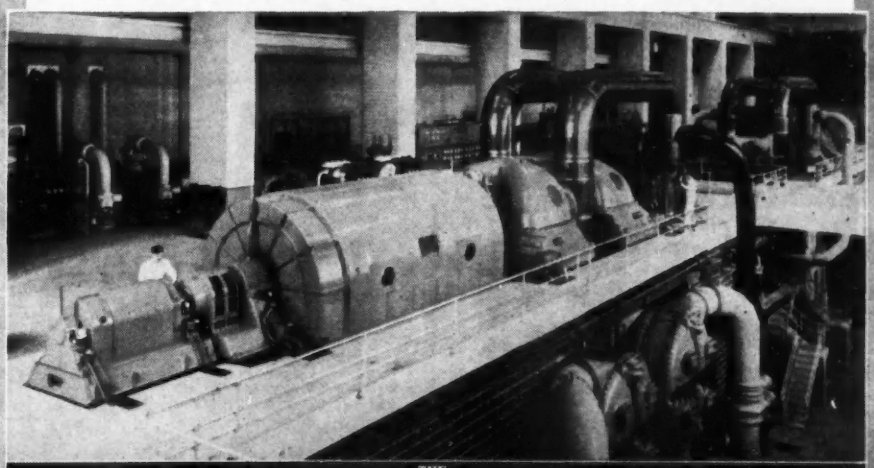
The first two 60,000 kW., 3,000 r.p.m. air-cooled turbo-alternators to be installed in England



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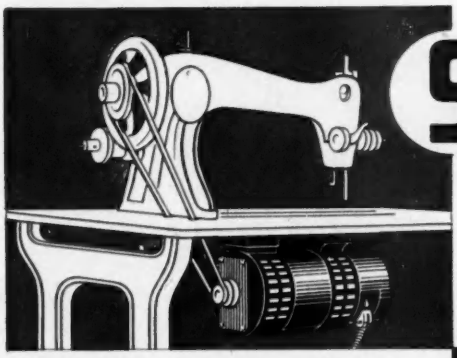

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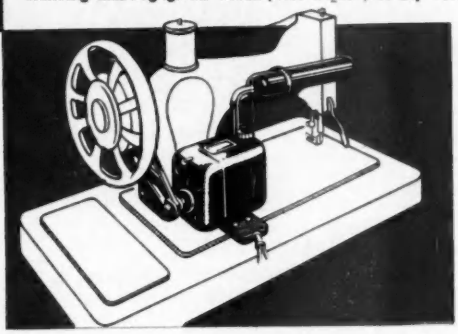

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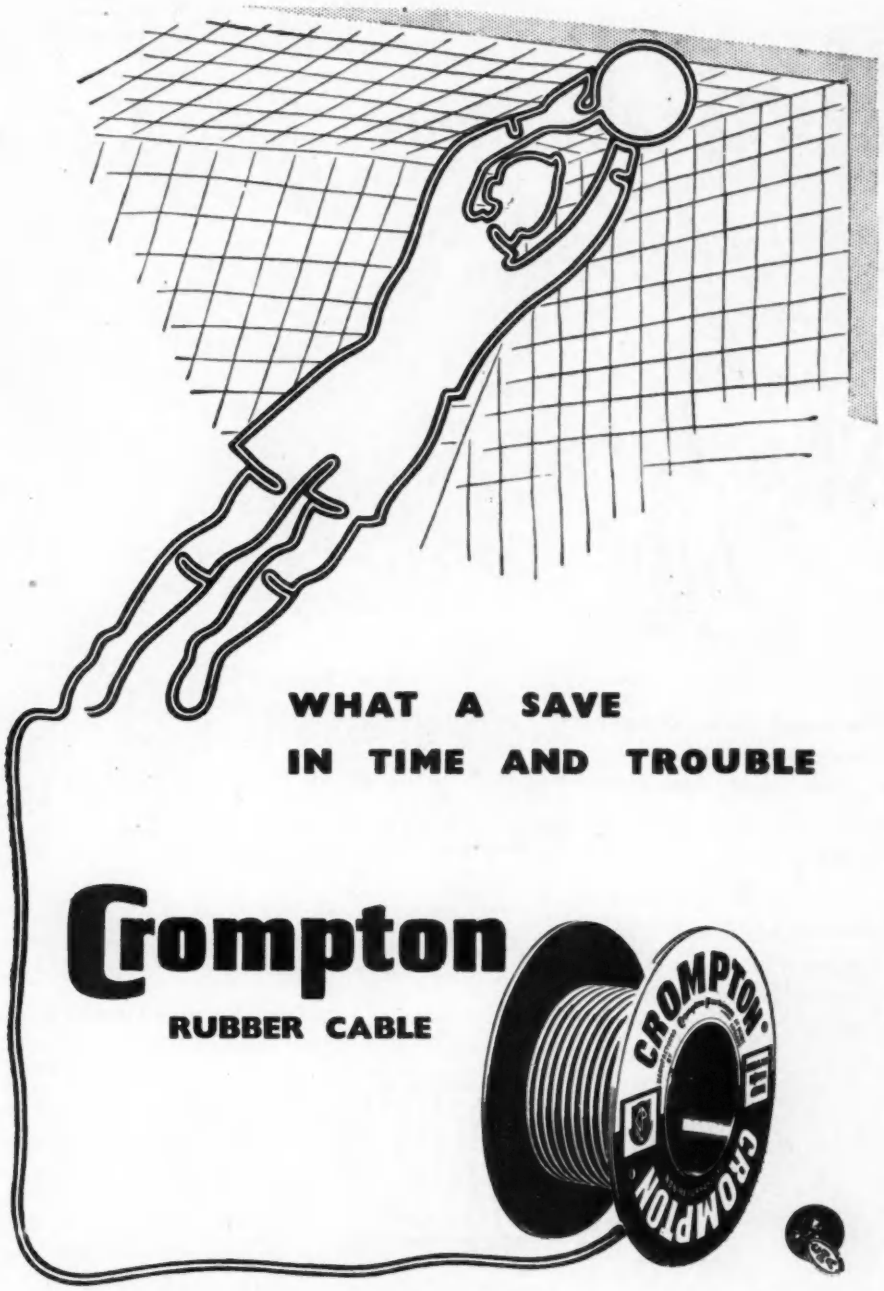

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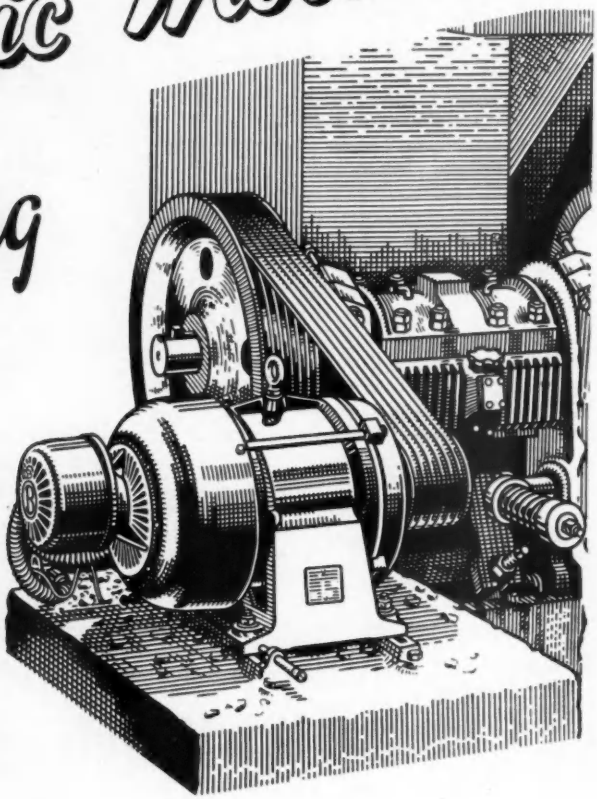
Brook Electric Motors...

Slip Ring Type



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With wound rotor. Suitable where starting load is heavy or where supply authorities limit the current taken at starting.

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EVEN A 30 lb BIRD

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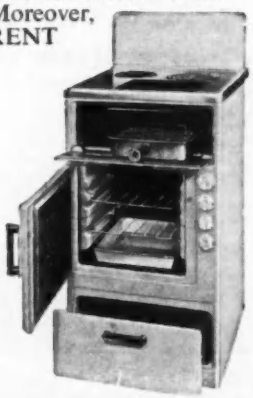

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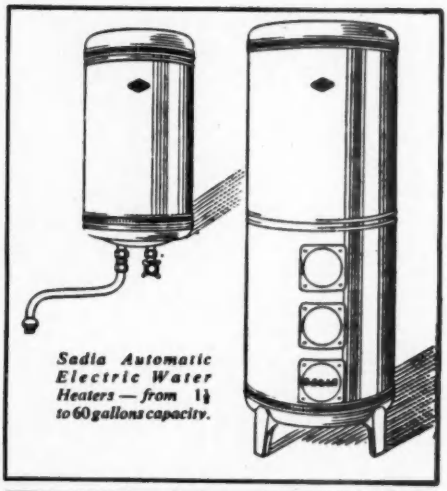

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Aidas Immersion Heating Units for all types of tank.

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THIS NEW LEAFLET gives full details of all the Aidas Immersion Heating Units—side-entry, top-entry, and external connection. Keep this complete information always handy in your file. If you have not yet had your copy of the Sadia Electric Water Heater leaflet, ask for one also.

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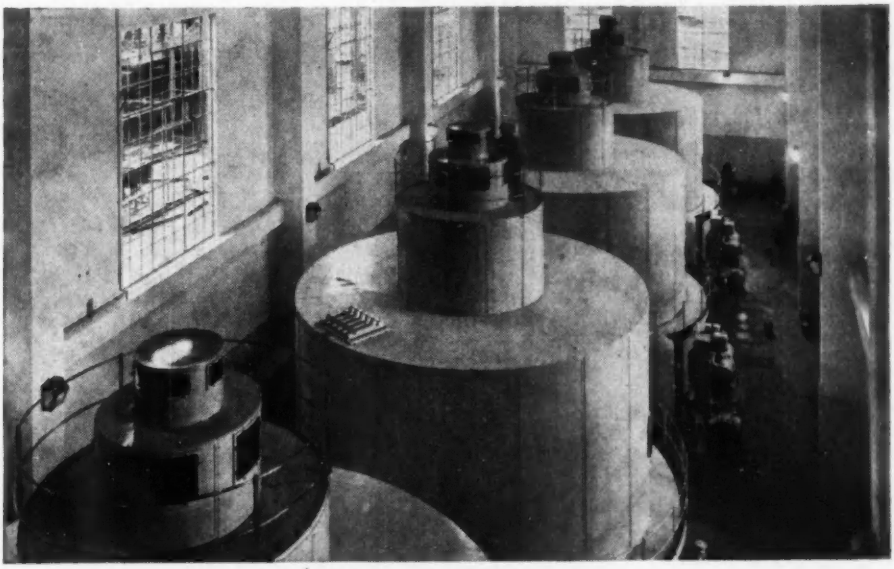
hydro-electric power



Power for half a city

The 130-Megawatt output from Loch Sloy will meet half the peak demand of a city as large as Glasgow. It will further the Scottish Hydro-Electric Board's work of electrifying annually the homes of 70,000 more people, and it will make the greatest individual contribution to the two thousand million unit increase from Scottish water power planned for the next five years.

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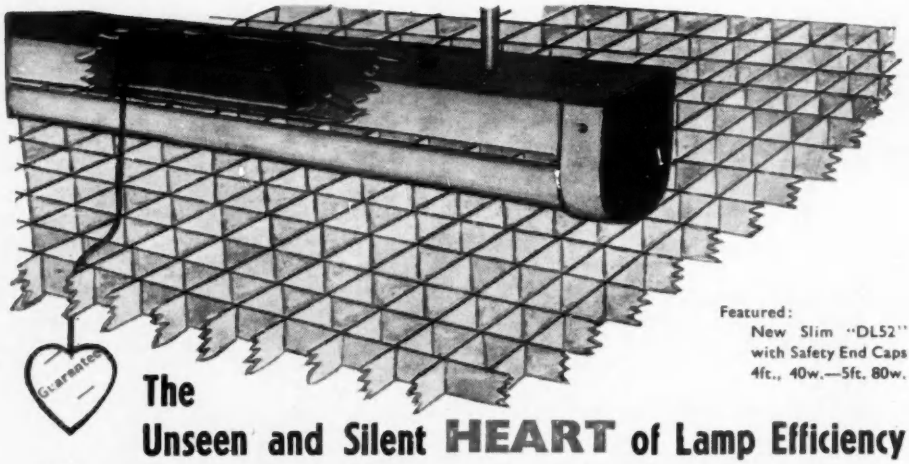

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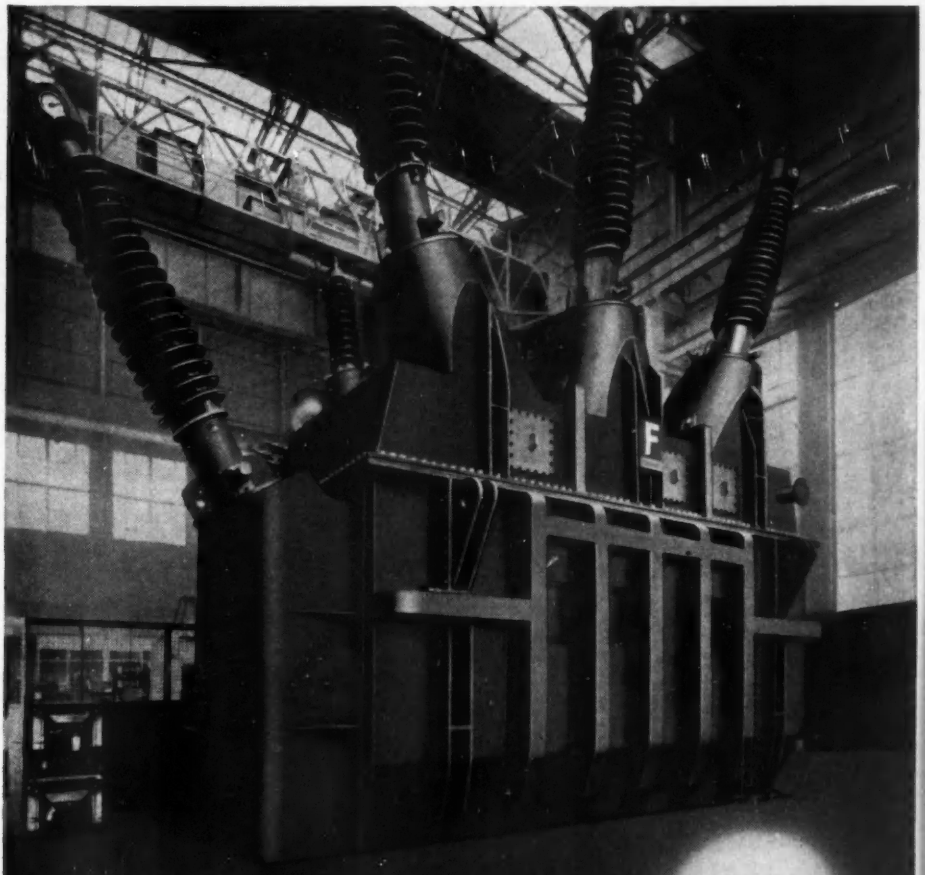

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FT101

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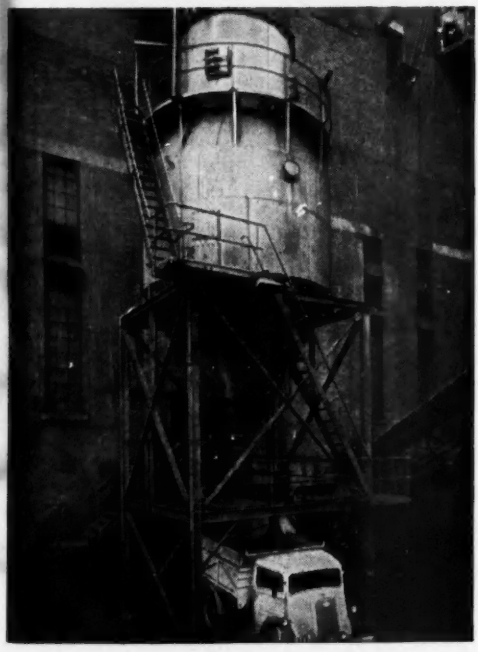

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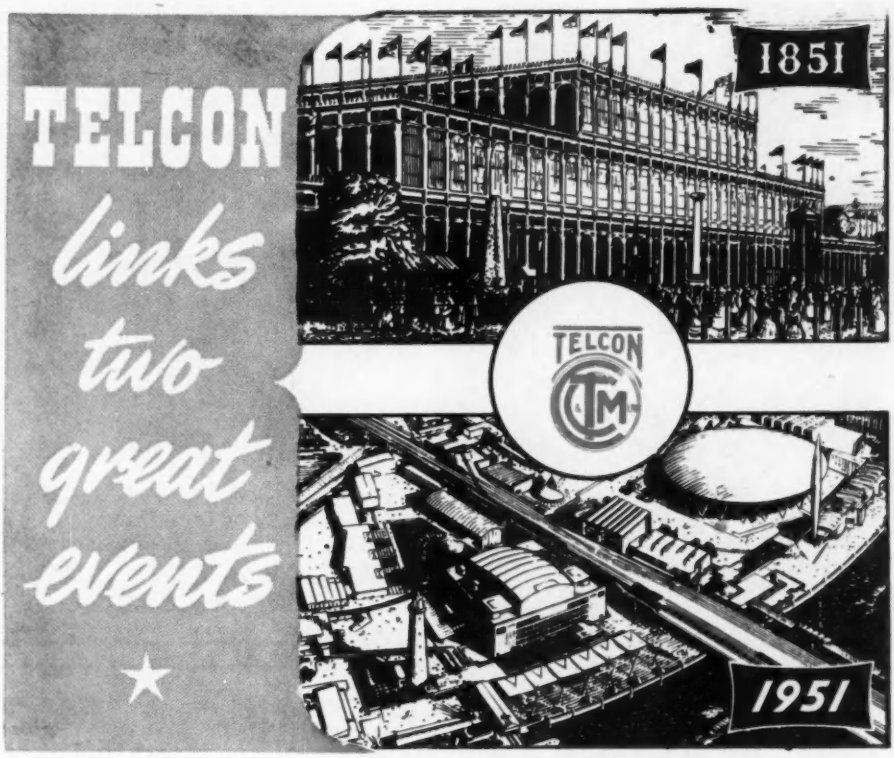

Telcon's founder, The Gutta Percha Company, exhibited at the Crystal Palace in Hyde Park and was awarded one of the coveted Council Medals of the Exhibition. In 1850 it had made the first submarine cable to be laid between England and France, the centenary of which was celebrated last year. From such adventurous beginnings has grown the present Telcon organisation the activities of which now cover a wide field in engineering and industry at home and overseas. Again, in 1951, the Festival of Britain Exhibition includes some examples of the outstanding Telcon developments of the present century.

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TELCON CABLES
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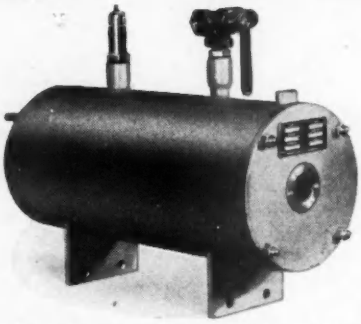

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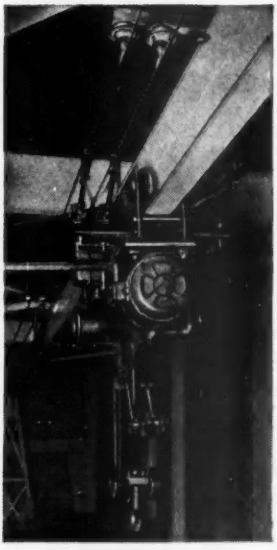

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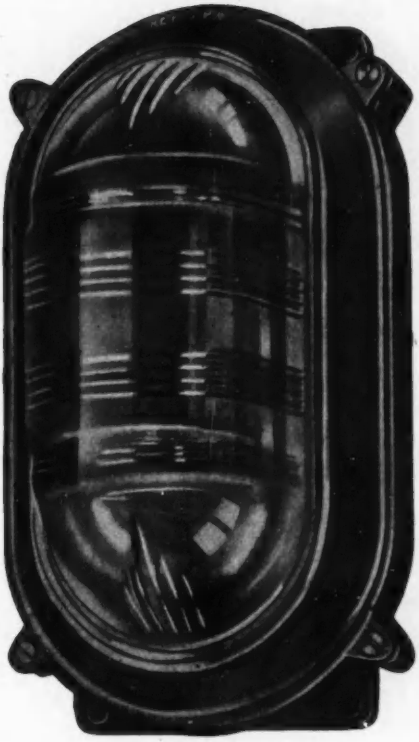

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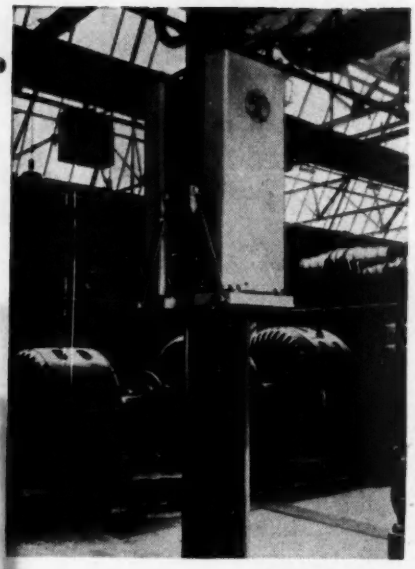
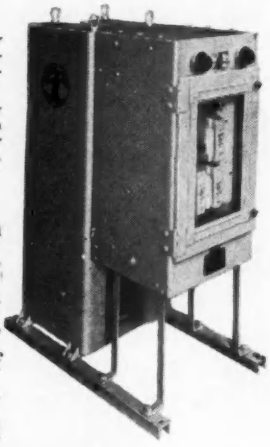


Standard Capacitors for POWER FACTOR CORRECTION

Left: 60 kVAr Power Factor Correction Capacitor (comprising 2 units, stanchion-mounted).

Right: 50 kVAr Capacitor with Contactor (part of an automatically-controlled Power Factor Correction installation).



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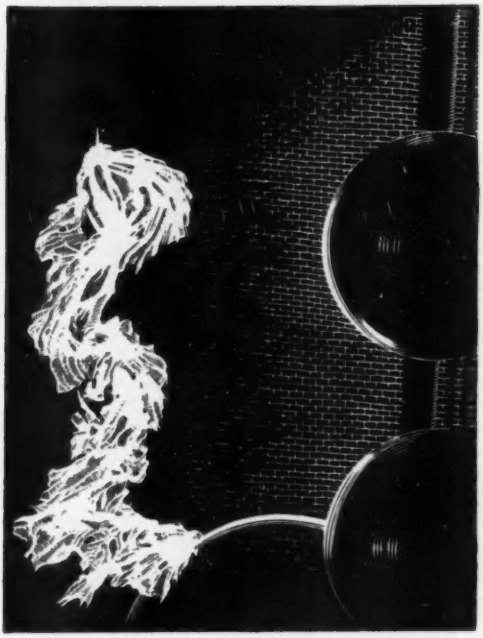

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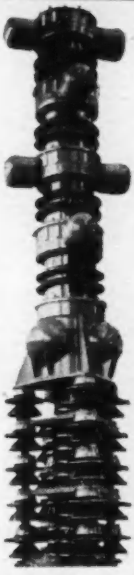

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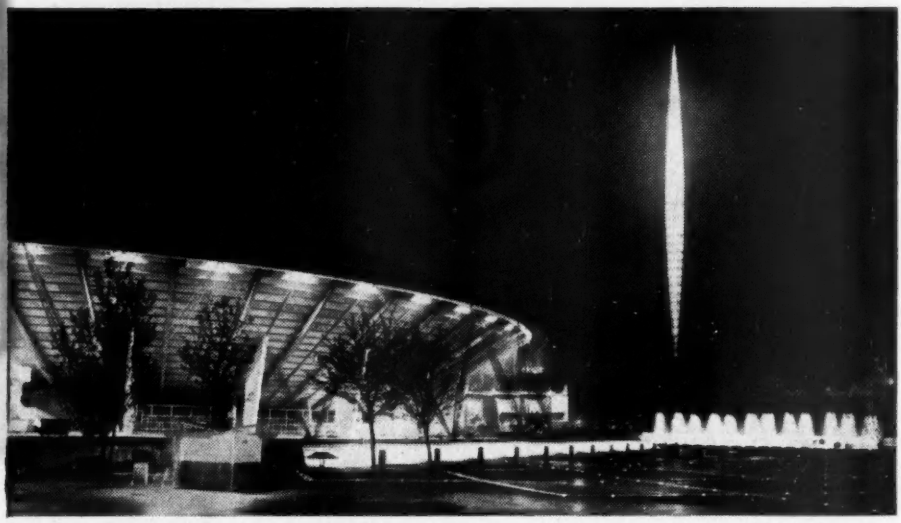

The photograph illustrates the lighting by Ediswan for the Dome of Discovery and Steps and Main Concourse

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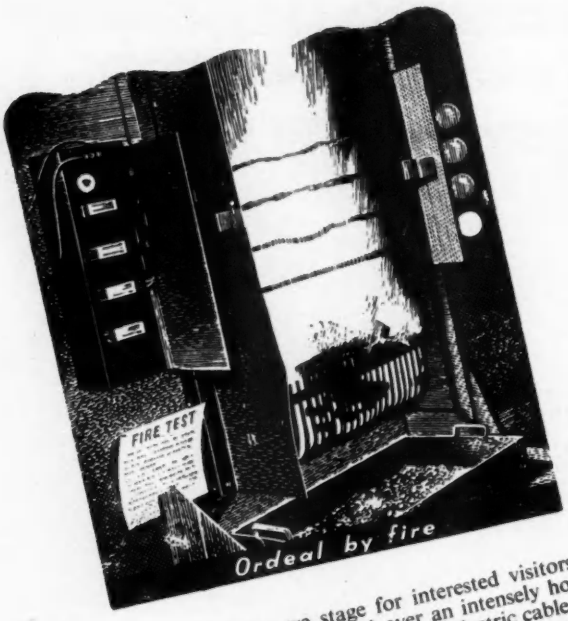

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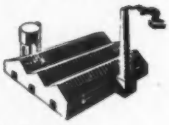

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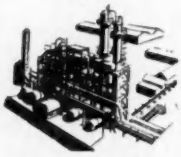
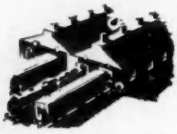


OIL REFINERIES



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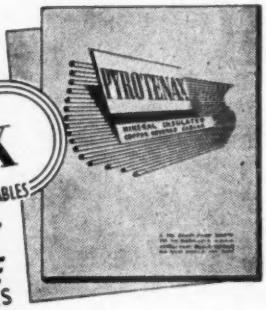

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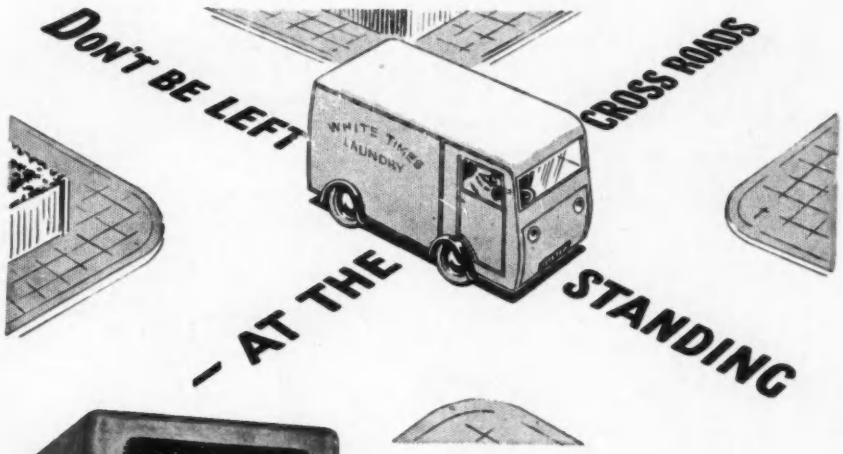

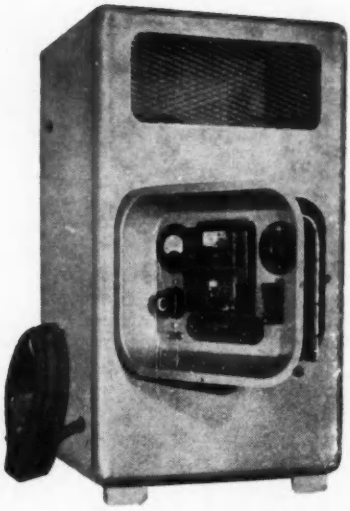

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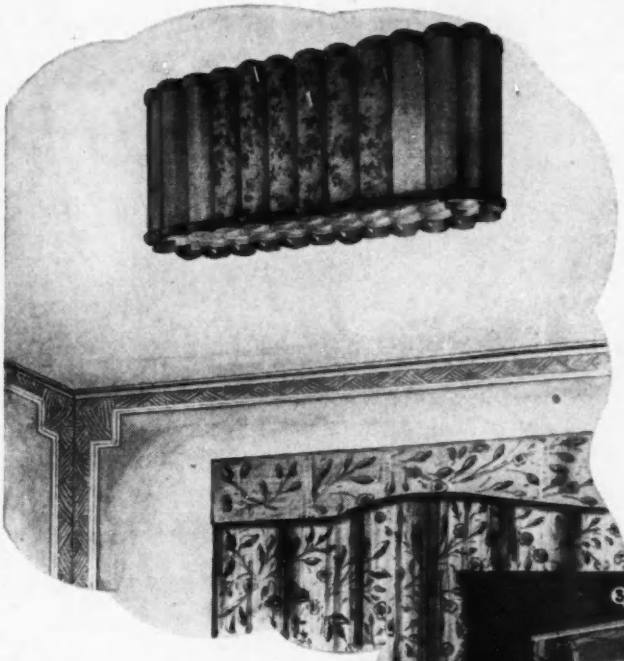

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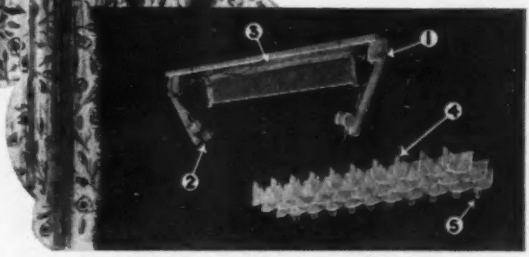

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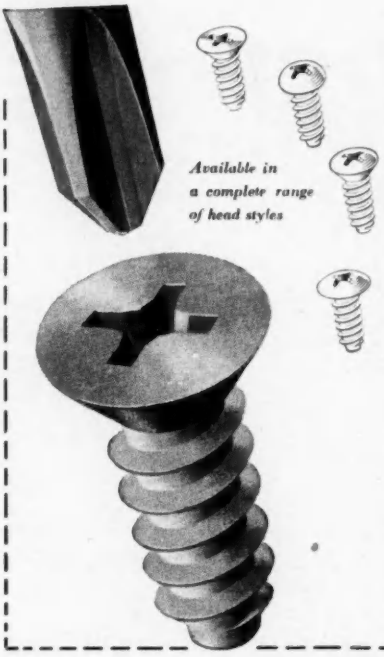

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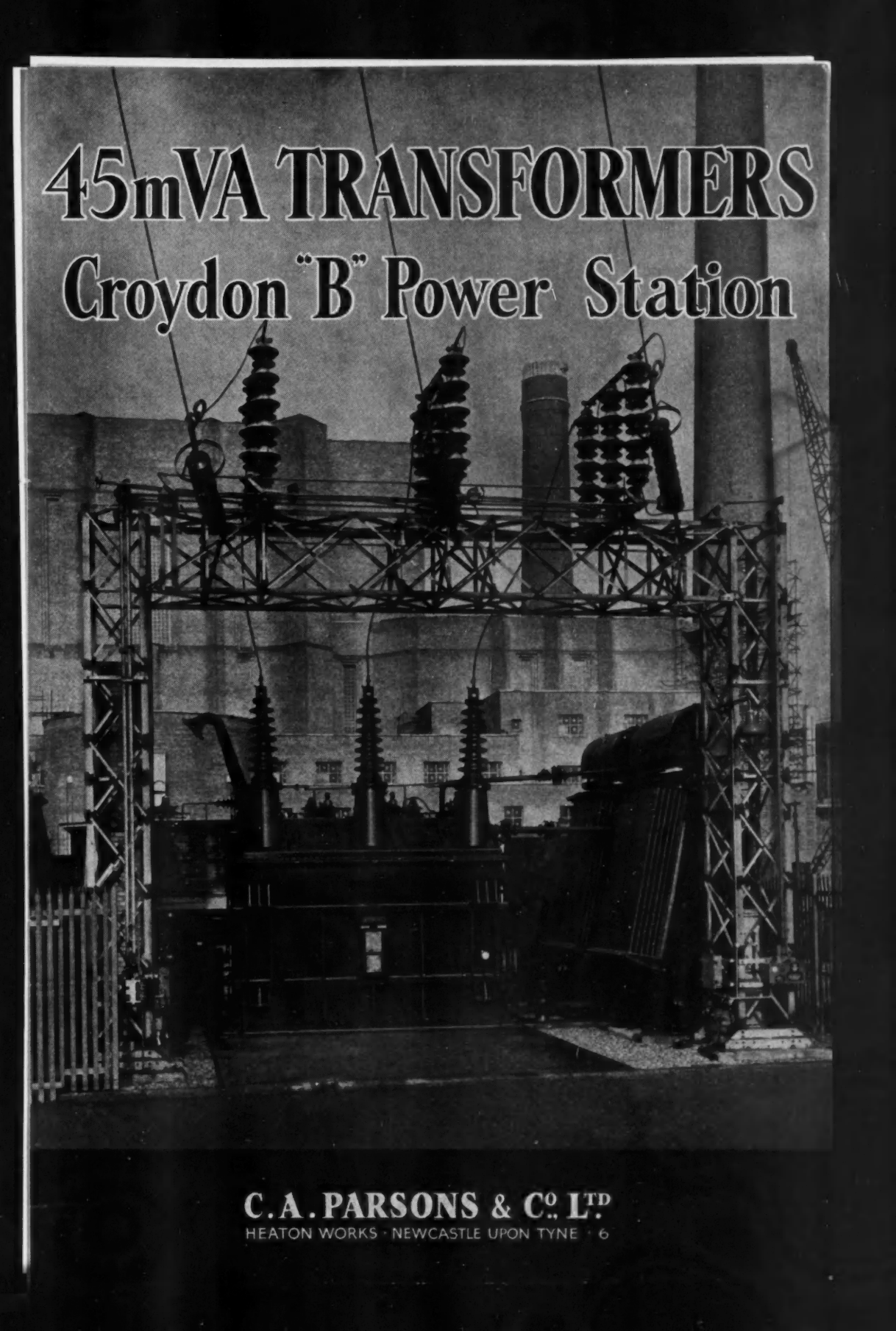

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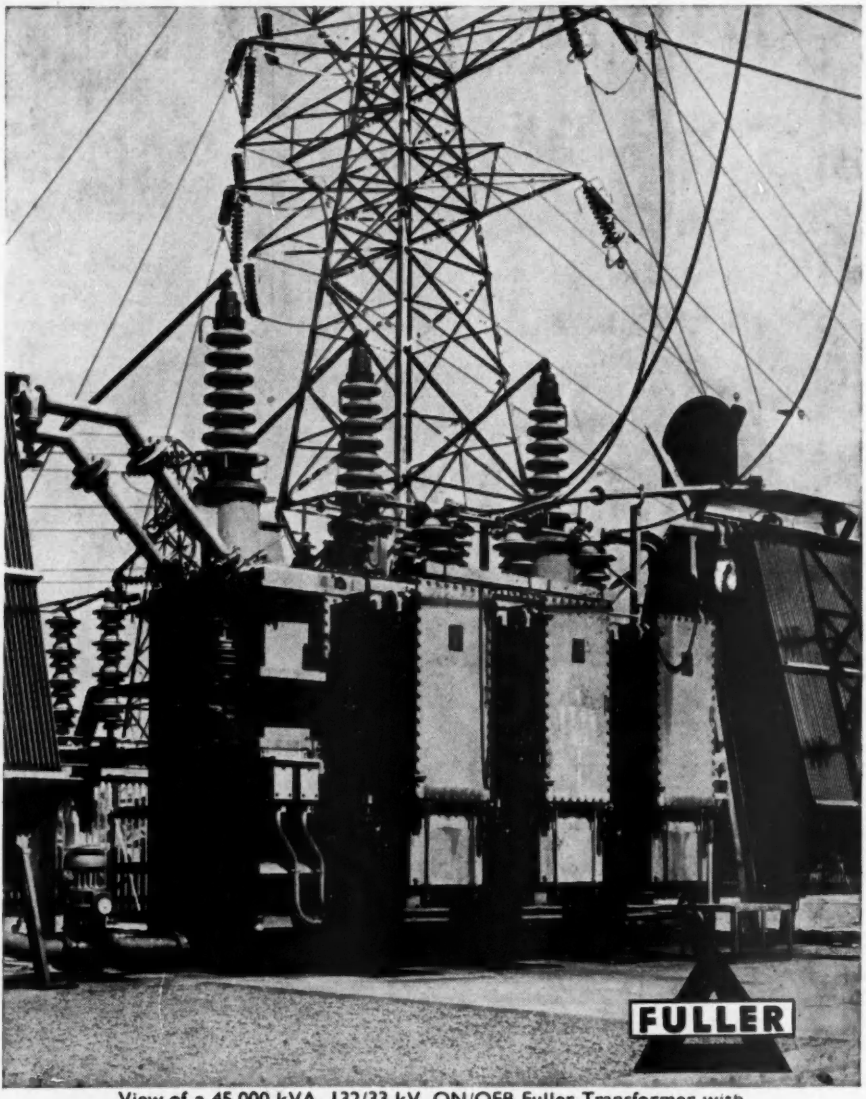

View of a 45,000 kVA, 132/33 kV, ON/OFB Fuller Transformer with On-load Tap Change gear, recently installed.

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Transport Section (Marine)
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Metropolitan-Vickers—GRS Ltd. will exhibit railway signalling equipment.

Hungerford Bridge Site
An actual electric locomotive, one of 65 ordered for the Manchester—Sheffield Line (Eastern Region) on loan from British Railways.

Dome of Discovery (Physics Section)
EM3 Electron Microscope.
Electroflux Magnetic Crack Detector. This will be wired for special demonstrations.
Display showing operation of Mass Spectrometer.

LONDON — Science Museum (South Kensington)
EM3 Electron Microscope, with typical microphotographs.

GLASGOW — Kelvin Hall Exhibition
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Rotor for low-pressure cylinder of typical 52·5 M W steam turbine.
Metropolitan-Vickers—GRS Ltd. will exhibit railway signalling equipment.

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LAND TRAVELLING EXHIBITION
Manchester, Leeds, Birmingham, Nottingham
Model of gas-turbo-electric locomotive, scale ½" to 1 ft, (sectioned).
Axial compressor from the "Beryl" jet engine—the rotor will be turning and the stator is part-sectioned.

* *Examples of modern street lighting and industrial fittings also on show.*

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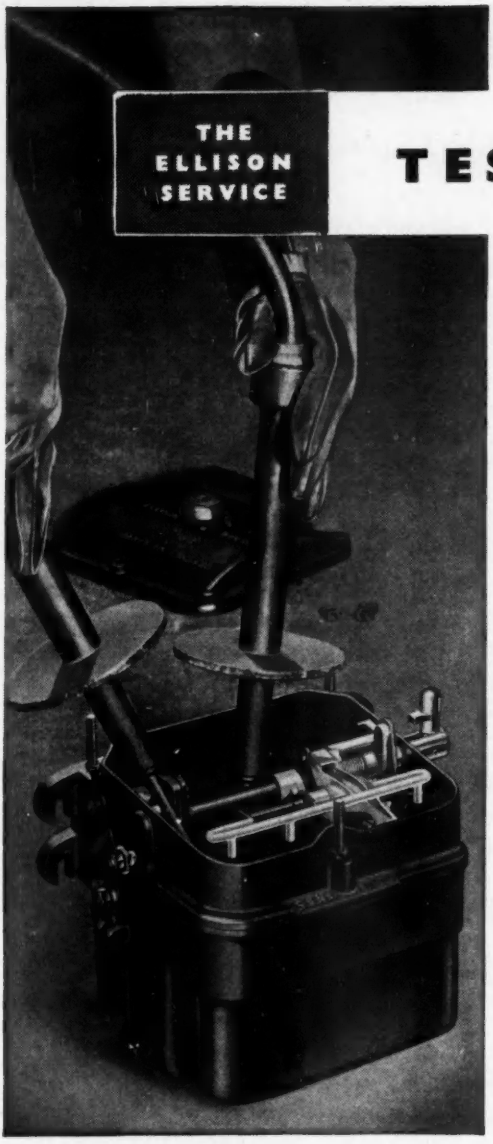

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ELECTRICAL TIMES

Vol. 119 No. 3107 THURSDAY 24 MAY, 1951

PUBLISHED EVERY THURSDAY

SIXTIETH YEAR OF PUBLICATION

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Editorial

OPERATION STANDSTILL

COMPARISON between this year's programme of papers for the E.D.A. Sales Management Conference with those of a twelve-month ago, leave little cause for rejoicing. Then, *Meteor* hailed the spirit of optimism which prevailed; the accent on real development and selling. Now we are back to marking time. The papers are interesting; they give evidence of deep thought and serious application. But there is little in their subjects—with the possible exception of Mr. Robinson's paper on lighting—which is of real inspiration to the man whose job in life is to sell electricity, and this retrogressive atmosphere is evident throughout the industry. Selling campaigns are suspended, cooker manufacturers are working below capacity and there is unmistakable evidence of a doubtful interest in load-control devices. Those who heard the Minister of Fuel speak at the E.D.A—E.A.W. conference could hardly fail to realise that his speech was little but a plea to restrict development rather than to expand. Piecing together various speeches made by public men in and out of the industry the picture which emerges is one of restriction—the gap between capacity and demand is to be closed from the other end—a procedure rather similar to that of putting a healthy youth in an iron cage to prevent him outgrowing his clothes.

TWO AREA TARIFFS

WITH the publication this week of standard tariffs by two area boards, it is difficult to refrain from comparison. Particularly is this so since in one case the final domestic charge is $\frac{3}{4}$d per unit compared with $\frac{7}{8}$d in the other. To some extent this difference is offset by a higher initial step in the block rate and the point of balance between the two tariffs is when the consumption per assessable room amounts to twenty units per quarter. In farming also there is a marked difference, and it will be noted in the details given on a later page that whereas in the Midlands Board, preference has been given to a simple block tariff based on floor area, a more complex scheme is adopted in the North Eastern Area. It is this latter board's tariffs which presents perhaps the greater interest, since not only is a $2\frac{1}{2}\%$ discount for prompt payment renewed but a wider variety of alternative rates is offered. One tariff, that for domestic load rate prepayment meters was essential because of the considerable number of such meters already connected in this area. It is difficult, however, to avoid asking whether it was necessary to offer ordinary domestic consumers a choice of two tariffs, one a block rate and the other a two-part tariff, both being based on assessable rooms. The only difference between them that Meteor can discover is that the latter is $2\frac{1}{2}$d per room per quarter cheaper.

USE THEIR KNOWLEDGE

MAY is an appropriate month in which to illustrate an idea with a metaphor drawn from the cricket field, and Mr. Lacy-Hulbert earns full marks for his characterisation of the true role of the plant engineer in industry, as the wicket keeper, and not the longstop. There is much to support this concept of the maintenance man taking a part in the game of greater productivity more active than his usual role of preventing the worst when things have begun to go wrong. Although a large number of concerns are realising the value of taking the plant engineer's opinion when new machinery is under consideration, there is plenty of scope for expansion of this attitude. Output per machine hour is the maintenance measuring rod, and it is essentially complementary to managements' fashionable concentration on per man hour. Continuing increases in machine output add to the seriousness of all break-

downs and outages for maintenance, and the maintenance man's estimates become correspondingly more valuable. But there is a challenge to the plant engineer in this advocacy of his taking a fuller part in planning: he must so train himself in engineering economics that he can appreciate the financial considerations that guide the management approach.

FLAMEPROOF SURGERY

EXPLOSION risks when electricity is used in an atmosphere containing inflammable vapours are familiar enough. It comes as a shock to be reminded that similar conditions may exist in the delicately scientific surroundings of the surgical operating theatre, where the heavy engineering approach becomes impracticable. New emphasis has been given to the difficulty by the increased application of electrical diathermy, and of electrically powered instruments. One approach to the problem is in the strict control of the anaesthetic used in relation to the spark risk, but there is another that comes directly in the field of the electrical engineer, earthing and insulation. How to prevent a patient charged to a definite potential above earth, from sparking over to the earthed metal of an operating table is one problem: how to guard against shocks from portable tools when they are used by an all-insulated surgeon—rubber boots and gloves—is another. So our old enemies, portable tools and earth leads are again major factors, even in these novel surroundings.

THE CHESTERS

PROVIDING help to less fortunate professional colleagues and their dependants is a duty that the industry carries out in an admirably unostentatious fashion. Only occasional appeals for financial support and annual reports stressing the unbalance between available funds and existing needs show most engineers how the work is continuing. The very circumstances in which assistance is given rules out the possibility of direct publicity. Last week a rift in this veil of reticence was occasioned by the opening and dedication of The Chesters, the residential estate planned by the Institution of Electrical Engineers as a practical memorial to members who gave their lives during the late war. All who were privileged to be present were deeply impressed by the beauty of the surroundings in which the estate is set, and the quiet restfulness of the buildings and their lawns, but something more important was apparent. Throughout the planning and execution of the scheme there has been an accent on the value of individuality, and the effect that has been produced comes very happily. In this result the central value of the I.E.E. Benevolent Fund and kindred activities is underlined: they help to impart a personal touch that escapes more comprehensive and official organisations.

Meteor

THE WEEK'S PHOTO

POOLE generating station is one of the new stations to be commissioned by the British Electricity Authority and is operated by the Southern Division. The site was acquired before the war by the Bournemouth and Poole Co., operating in conjunction with the County of London Co., the initial engineering being supervised by the latter. The site consisted of some 30 acres of mudlands and saltings on the Holes Bay side of the Hamworthy Peninsula, immediately facing the town of Poole. Site conditions generally were extremely difficult, due to the depth of the alluvial mud overlying the pottery clays, and a massed concrete slab was constructed to form a foundation for the turbine house, transformer bays and the boiler house. The precipitators, chimneys, administrative blocks, coal-handling gear, etc., were all founded on piles. The frontage abutting Holes Bay is approximately 1,000 ft, of which 500 ft constitute the coal wharf and 300 ft the ash barge berth.

The station has been designed to house four 50 MW turbo-alternators and eight 300 klb/hr boiler units. The boilers are by International Combustion Ltd., and of the turbines two are by Metropolitan-Vickers and two by C. A. Parsons Ltd., all four operating with 900 lb/sq in. and 925° F at the stop valves. Output is stepped up to 132 kV on individual machine transformers and all main switching is carried out on the outdoor 132 kV switch-compound seen in our photograph.

No. 1 M.V. turbo-alternator and No. 1 boiler were commissioned in December, 1950, and it is hoped before the end of this year to have three turbines and, possibly, five boilers in service, with the remaining units being commissioned in 1952. No. 2 boiler was commissioned at the end of March, 1951. Up to March 31 last, the station had generated 40·433 million kW.

ELECTRICAL TIMES POWER STATION SERIES
No. 71.
Poole

Rectifier Controlled Variable-Speed Drives

A CRITICAL APPRECIATION OF THE MORE USUAL METHODS

By J. C. MILNE, M.I.E.E., M.A.I.E.E.*

MANY articles have been published dealing with the use of rectifiers for variable speed drives, and in almost every case, the type of drive described has used the grid controlled rectifier. There are, in fact, three main types of drive using rectifiers as a source of controlled power for variable speed drive. In every case, however, the same basic principles apply, namely, to obtain a variable d.c. power supply from the rectifier to feed the armature of a d.c. motor and thus to obtain a variable speed.

The first of these three main methods of obtaining this variable d.c. output from the rectifier is by tapping the input transformer to give variable a.c. anode voltage and consequent variable d.c. output. This provides stepped control, but by using a shunt regulator the speed of the motor may be controlled between the steps. While this method is economic it is only suitable for motors of up to about 5 h.p.

The second method is by using a grid controlled rectifier and the third is by using an induction regulator. It is with these two latter methods that this article is concerned.

General Aspects of Grid Control

Although the various systems of grid control differ in detail, the fundamental problem is to obtain a variable d.c. supply for the armature of the motor. The rectifiers themselves are manufactured in various sizes and are well known to electrical engineers. Their application, however, to motor speed control raises several problems, and while apparently they offer an ideal solution there are many difficulties in their application to large drives. In order to make a comparison between grid control and induction regulator control, the general considerations which follow have been simplified and practical examples given. In these examples, the three-phase unit has been selected but the same problems arise with six or twelve phase equipments. Further questions of inductance capacitance and angle of overlap have been neglected. Thus the examples are mainly of academic interest, although they serve to illustrate the basic problems which arise in the application of the two methods.

In order to appreciate the situation using a simple grid controlled rectifier, reference should be made to the diagrams. Fig. 1 serves to illustrate the basic circuit adopted. In Fig. 2, the relative wave shape is shown when the motor is running at full speed. Figs. 3 and 4 show the wave shape when the motor is running with 50% and 75% grid control respectively.

Now assuming that it is desirable to produce constant torque over this speed range, it is obvious that the same average current should be delivered to the motor. In the case of Fig. 2, with no grid control, the voltage is applied to the anodes over the full cycle, and in consequence, current flows in the circuit over the whole cycle. Let the average current flowing

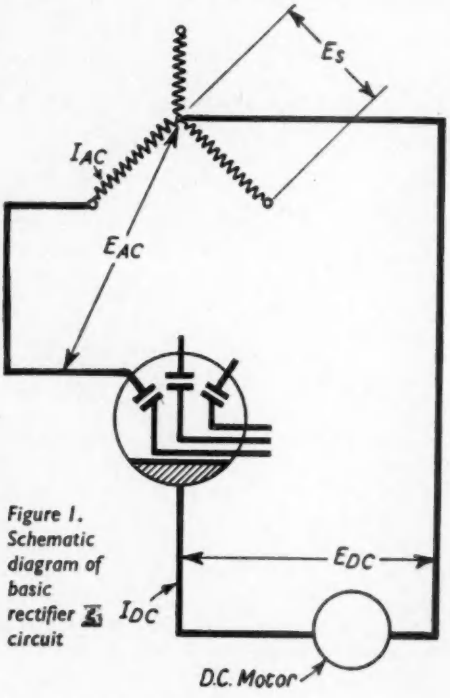
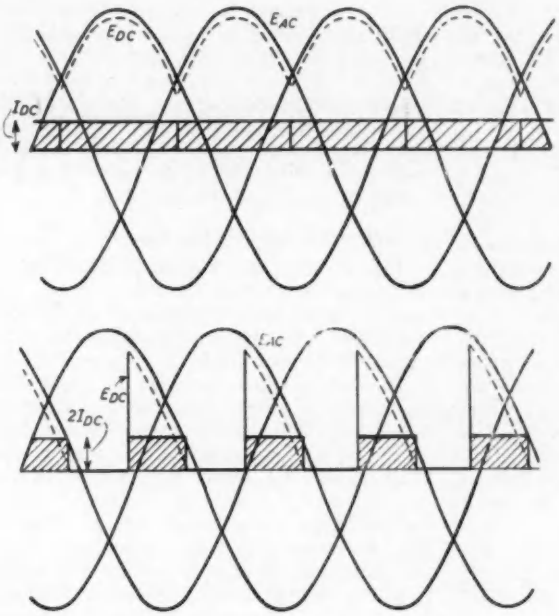
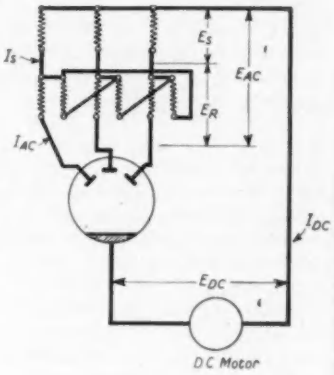


Figure 1. Schematic diagram of basic rectifier circuit

* Mr. Milne is with the Electric Construction Company, Wolverhampton.



Figures 2 (left) and 3 (below left) show the waveform with no grid control and 50% grid control respectively. Figure 5 (below) shows the basic circuit of an induction regulator drive control system



in the d.c. armature circuit be I_{dc}. Under these circumstances the motor will be running quite normally and the apparent power factor would be about 0·83.

In the case of Fig. 3 (50% grid control) the voltage—and therefore the current—is only allowed to operate for 50% of the time. The voltage wave is thus E_{dc}, and since the same average current must flow as in Fig. 2 the peak current value (averaged over half the cycle) must be $2I_{dc}$ to produce constant torque.

The same argument applies to Fig. 4, p. 864, where it can be seen that the peak current (averaged over one-quarter the cycle) is $4I_{dc}$.

Wave Form

It can readily be seen that the voltage wave shape applied to the motor is very bad in form, and when the inductance of the a.c. and d.c. circuits involved is quite high, the effect is to create harmonics in the system which create bad commutating conditions on the motor.

The current wave shape is also extremely peaky, and as explained before for 75% grid control the peak d.c. current would be $4I_{dc}$, this again causes bad commutating conditions on the motor as, of course, the armature reaction and interpoles are affected directly by the ampere turns and with $4I_{dc}$ flowing iron saturation becomes a serious problem. Also with the high current pulses involved the voltage drop in both a.c. and d.c. circuits is high and losses increase appreciably.

Under these circumstances the speed regulation is seriously affected and without automatic correction of some type, the variation in speed of the motor from full-load to no-load would be approximately as shown below.

Full speed: 1,000 r.p.m./1,200 r.p.m.

Half speed: 500 r.p.m./950 r.p.m.

Quarter speed: 250 r.p.m./800 r.p.m.

Electronic speed correcting devices are, therefore, usually required.

The difficulties are not confined to the rectifier and motor alone, however; the a.c. supply circuit is directly affected by the peak current flowing in the d.c. side, and the mains disturbance in the case of a large drive can be very severe and objectionable on the grounds of wave distortion and radio interference.

Power Factor

Referring again to Fig. 1, if the same average current is flowing in the d.c. circuit to produce constant torque, the same current will necessarily flow in the anode circuit of the rectifier, and must be drawn from the a.c. mains. The anode voltage of the rectifier, however, remains constant at mains voltage and therefore the kVA input to the rectifier remains constant, irrespective of the d.c. output. It will be seen,

therefore, that with 75% grid control, i.e. with 25% d.c. output, the kVA input will be the same as at full d.c. output. Thus the power factor—or apparent power factor—due to wave distortion will be 25% of full load p.f., i.e. 0·21 approx.

To overcome the difficulty of poor p.f., one would initially consider the possibility of using condensers. The low p.f. is not, however, only due to lagging current, but to current distortion due to the grid controlled rectifier which causes an appreciable difference between the r.m.s. and average values of the current flowing in the primary side of the transformer. It is, therefore, not possible to correct the p.f. by using condensers, as these compensate for lagging current. In fact, due to the serious wave distortion, unless special care is taken with any condensers that may be used for p.f. correction on the primary side of the transformer, trouble can be experienced because the rectifier harmonics can set up heavy circulating currents.

The only practicable method of increasing the p.f. is by the use of expensive and complex transformers, the use of which would reduce the ratio of average to r.m.s. current. In any case, improvement above 0·35 at 75% grid control would be extremely difficult and certainly expensive.

The figures given above and the arguments presented are intended to provide the reader with a general simplified picture of the situation. There are, of course, many other features which modify this simple theory in practice, but on the whole, these factors are comparatively minor.

In an endeavour to overcome some of the difficulties inherent in the use of grid control, the induction regulator control drive was developed and has now been operating satisfactorily for the last ten years. This equipment, although somewhat more expensive than the grid control equipments, overcomes many of the serious objections to grid control, and is extremely satisfactory in operation.

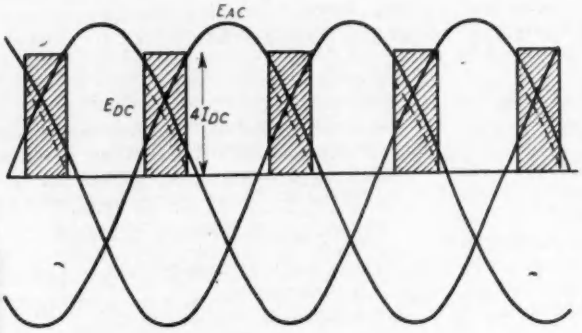
Induction Regulator Control

Figs. 5, 6, 7 and 8 show diagrams of an induction regulator control drive. In Fig. 5 is shown the schematic diagram of connections while Figs. 6, 7 and 8 show the waveforms at full speed, 50% speed and 25% speed respectively.

In the system employing an induction regulator, the supply voltage to the anodes of the rectifier is varied by moving the armature of the inductor regulator relative to its stator. This varies the phase and voltage of the secondary of the induction regulator relative to the phase of the supply voltage. Thus in Fig. 9 (which shows the vectors concerned) E_s represents the supply voltage, E_r is the regulator voltage, and E_{ac} is the anode voltage. By moving the induction regulator vector E_r moves round vector E_s varying the anode voltage from E_{ac} from minimum to maximum.

In Fig. 6 it will be noticed that the same voltage and current wave shape occurs as in Fig. 2. This is so because a three-phase induction regulator drive produces exactly the same wave shape as a standard rectifier without grid control.

Fig. 7, which shows a 50%



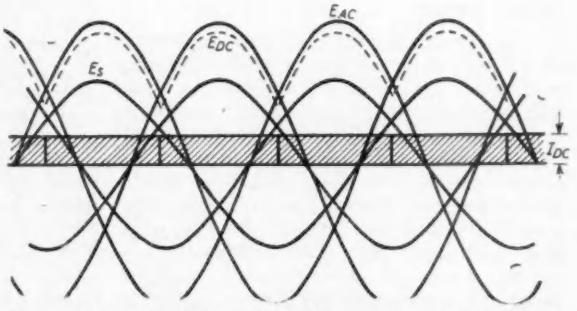
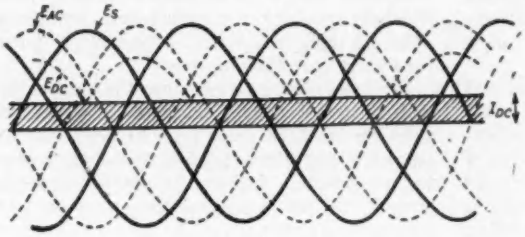
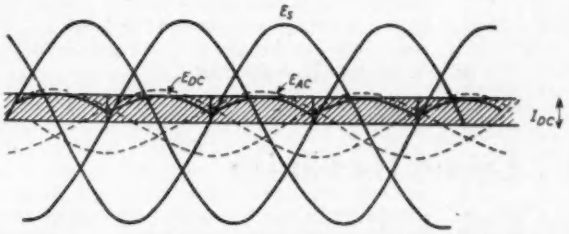


Figure 4 (above left) shows a rectifier waveform with 75% grid control. Figure 6 shows waveform using an induction regulator at full speed





Figures 7 and 8 above, illustrate the waveforms using an induction regulator, at 50% and 25% full speed respectively

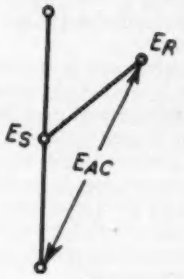


Figure 9, the vector diagram, illustrates the principle of operation of the induction regulator

speed reduction is very different from Fig. 3. In the case of Fig. 7 the voltage applied to the armature of the motor is reduced to half voltage because the a.c. voltage to the anodes of the rectifier has been reduced by the induction regulator. I_{dc} will therefore flow for the whole cycle, and the problems associated with part cycle flow do not exist.

Fig. 8 which shows a 75% speed reduction again clearly shows the reduced anode voltage, reduced d.c. voltage and current flowing for the whole cycle, so that at quarter-speed the peak current and average current in the d.c. circuit is the same. The speed regulation is therefore very much better, as there is no increased drop due to high r.m.s. currents caused by grid control.

The conditions of operation for the motor are therefore quite normal; there is no trouble with commutation, flux density, heating, etc.

Since the d.c. voltage and therefore speed is reduced with reduction of anode voltage, and as the current flowing in the circuit is constant for constant torque, kVA input varies as anode voltage and current, so it will fall directly as the d.c. output and speed. Thus the power factor remains constant at about 0·83. This is very different from the case of grid control where anode voltage and anode current remain constant irrespective of speed.

Ignitron Control Drives

Ignitrons are used to control the speed of motors in exactly the same way; as do the rectifiers, so the ignitrons themselves control the armature voltage to the motor. The same general principles apply as in the case of the grid controlled rectifier, i.e. d.c. voltage and motor speed are controlled by wave chopping. The same problem applies therefore in the use of the ignitron controlled drive as in the grid controlled rectifier drive.

Conclusion

From a study of the attached curves and diagrams and the above explanation, it will be seen that induction regulator control has very many advantages over grid control from an operational point of view.

The d.c. voltage and current with induction regulator control are quite normal, and the average and peak values are approximately constant, both in voltage and current.

In the case of the grid controlled rectifier or ignitrons, the peak values are very much in excess of the average value resulting in excessive speed variation, copper loss and resistance drop, poor power factor and very bad operating conditions for the motor.

One of the major requirements when applied to heavy machines, is high starting torque which must be produced, and it will be obvious from the foregoing that with induction regulator drive the overload facilities are very much greater. If one considers briefly the question of 100% overload at starting speeds, and realises the peak value of the current involved with both systems, the operating conditions can be readily visualised.

In the case of drawbench, rolling mill, paper mill and gas booster drives, using relatively large motors, induction regulator drive is generally preferable.

In the case of drives which require reduced torque at low speeds, also in the case of drives where armature control is only used for acceleration (shunt control is used for speed control of the motor), grid control offers an economic solution. In this latter case, however, there is much to be said in favour of the induction regulator controlled drive which on economic grounds, would compare favourably due to the smaller d.c. motor required.

Great care must be taken in the selection of the type of drive and it must be appreciated that in the case of grid control the speed is controlled purely by electronic methods and generally speaking electronic speed controllers must be used to correct for the large speed regulation at reduced speeds.

While an electronic equipment is quite satisfactory in operation, failure of these devices must be expected from time to time, due to valve life limitations and despite elaborate protective devices. Failure to control electron streams in the main rectifier even for an instant is dangerous.

The design and application of the variable speed rectifier drive is a complex and specialised subject, and in the above article an endeavour only has been made to point out the fundamentals involved in the selection and operation of this type of equipment.

E.T.U. Loses Its Claim

THE claim of the Electrical Trades Union in regard to the Bethnal Green contracting dispute (see ELECTRICAL TIMES, May 3) has been rejected by the Court of Inquiry. Side-stepping the original cause of the dispute, which the Court considers is a matter for the trade unions concerned to settle, through the machinery provided for that purpose within the trade union movement, the Court has turned to the larger issue—union membership.

Giving its conclusions, the Court states that the case of the E.T.U. for separate negotiating machinery in respect of the men in contracting departments of Area Boards rested mainly on the contention that those departments were an integral part of the contracting industry. Yet, according to figures put forward by the B.E.A. (and not disputed by the E.T.U.) out of over 9,000 electricians employed by the Boards wholly or mainly on contracting work, about two thirds were paid at "supply" rates and one third at "contracting" rates. A further 1,700 engaged sometimes on "supply" work and sometimes on "contracting" received "supply" rates. This position, the Court points out, had arisen largely through the E.T.U.'s own initiative. Also, interchangeability between supply and contracting work is a widely established practice so far as employees of the Boards are concerned; sometimes, indeed, as at Bethnal Green, the men in the contracting department are employed more on supply than on contracting work.

Such interchangeability is a desirable and sensible arrangement, especially at the smaller depots. Complete segregation of supply and contracting activities as suggested by the E.T.U., while it might be practicable in some cases, would in general be a retrograde step, and one which, as some of the other Unions pointed out, might well operate to the workers' disadvantage in times when business was slack.

Accordingly, the Court is of the opinion that the Electrical Trades Union has not established a valid claim for entirely separate negotiating machinery in respect of such men. (The case, put forward by the E.T.U., of the building trade workers, who form a group of trades quite separate from the rest of the electricity supply industry, does not seem to the Court to be analogous.)

It is considered that a reasonable way of recognising the special position of these employees within the supply industry, would be by means of a separate sub-committee at which the E.T.U. would have a preponderance of representation, as suggested by the B.E.A. The E.T.U.'s objection to such an arrangement—that the sub-committee's recommendations would be subject to endorsement by the whole N.J.I.C.—the Court feels is of theoretical rather than practical importance. For, if joint machinery is operated by all concerned in a proper spirit of co-operation and goodwill, the recommendations of such a sub-committee would not be overturned by the parent body except for some exceptional reason. In practice such arrangement should provide the E.T.U. with proper safeguards and an adequate degree of autonomy in respect of those employees. The Court considers it most unfortunate that the procedure for inter-union transfers was not originally followed in this instance, and suggests that the L.E.B., in intervening in the dispute, should have diverted it into the proper channels. For it is through those channels that the original dispute—whether the man should change from the T. & G.W.U. to the E.T.U.—has now to be settled.

Finally, all parties concerned are urged to approach the problems in a spirit of co-operation and goodwill and thus foster the harmonious working of this great nationalised industry.

Our readers' views . . .

Supply Tariffs

THE South Western Electricity Board is about to introduce a new domestic tariff—one tariff for all domestic consumers in the whole area.

Consumers will no longer be able to choose the tariff most suited to their requirements nor is there to be any tariff inducement to increase diversity or to fill the valleys in the load curves. Surely the value of different tariffs developed by Municipal and Company engineers over the last 30 years cannot have been forgotten? The present aim at uniformity must tend towards less diversity and an aggravation of the peak load problem.

Tariff uniformity may be convenient to the operating authority but I submit that the skill and ingenuity which, in the past, supply engineers have shown in developing tariffs was neither pointless nor ineffective. In particular, it is essential that off peak and night loads should be increased as soon as possible.

It might have been expected that any new tariff would have, as one of its principal aims, the reduction of the peak load problem, the Achilles heel of the B.E.A. if not of the Boards. It must be very disappointing to many who have given a lifetime of service to the supply industry to find the lessons of experience being ignored.

R. H. Cobbold

BRISTOL

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Industry and the E.T.U.

AFTER reading the report of the E.T.U. Conference recently held, one is led to reflect that the old saying is still true—you can take a horse to the water, but you cannot make him drink. What (with all due respect) did the E.T.U. expect? They were the most clamorous for taking this very large horse to the waters of nationalisation, and now in spite of prods and heavy pulling on the bridle, not to mention an occasional sharp smack on the rump, it will not drink! We have terminated what were once referred to as "Power Company Monopolies" only to find we have created one of the largest oligarchal monopolies in the world—we do not even know who is the boss!

The truth of the matter is that the E.T.U. and similar organizations have been grossly misled—they were promised the moon in return for the support of their members' votes, and so far have only received a small portion of star dust.

No amount of argument in the world will disguise the fact that a huge business combine has to be run on business lines or it will soon cease to be in business. I am certainly in favour of participation of the "workers" in the management of the National Industries, but they must be fully qualified—we have had enough of duds meddling.

Certainly, liquidate the compensation stock, *but be fair about it* and act as if it was their own interests they were dealing with, remembering that it was the hard work of the former owners which provided them with this prosperous industry ready made.

In the absence of a "boss" of the Industry, why not revive the Electricity Commissioners as an independent arbitrating body for all types of claims and disputes, and when I say independent, I mean of course absolutely free from all Government control.

One of the private companies' first aims was the assessing of wage and salary adjustments and claims—how else could they satisfactorily issue proper balance sheets—we do not even have these now! As the Goverment has now found out (to the nation's cost) it is easy to advocate this and that, promise things that are impossible of fulfilment, take over complex businesses in an airy manner, and then find one does not know the first thing about them. The final result is that industrial unrest is all too evident, high costs of living accrue, and we are in a worse plight than when we started.

G. B. Jobson

WHITCHURCH

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Appeal to Manufacturers

MAY I suggest to manufacturers that it will greatly help the retailer in his present day selling problems if Purchase Tax is merged with the price of the appliance to give one composite retail total in future advertising and literature. This practice has been adopted to advantage by certain other trades.

K. Rayment
(BOWERS & BARR, LTD.)

GT. YARMOUTH

TOWARDS STANDARDISATION

New Tariffs of Two Area Boards

TWO Area Boards have this week released full particulars of their new standardised tariffs. They are the North Eastern and the Midlands. In its quest for the simplification and standardisation of methods of charging for electricity in its area, the North Eastern Electricity Board proposes shortly to introduce new tariffs which contain a number of interesting features. There is, of course, a domestic block tariff, providing for 9 units per quarter per assessable room to be charged at 4d. per unit, the next 9 units per quarter per room at 2d., and all in excess at ¾d. In addition there is an alternative two-part tariff, under which a fixed charge of 3s. is made per quarter per assessable room, with a running charge of ¾d. p.u. On both of these tariffs, a discount of 2½% is offered if payment is made on or before the date specified in the account.

There is also a domestic prepayment meter tariff of 6d. p.u., with a 20% rebate at collection time, and a load-rate where electric cookers, water heaters and other similar approved appliances are installed. Under the latter rate, the charge is 1¼d. p.u. when the load exceeds 400W, and 6d. p.u. below, with a rebate of 15%.

Falling in line with the present tendency, the Board offers the same domestic block tariff for supplies to farm houses. But for use in farming purposes, there will be a fixed charge of £1 17s. 6d. p.q. for each £100 of capital expended by the Board in making the supply available, plus a block tariff, with units charged at 4d. on the first block, 2d. on the second, and all in excess at ¾d. p.u. The number of units in each block depends on the means by which the supply is afforded. Where farming supplies are taken from the Board's low or medium voltage system, no fixed charge will be payable unless the service line exceeds the usual specified limits.

For supplies to shops, there is a variable block tariff, based on floor area, which for this purpose is taken as "selling" area, plus 25% of the "non-selling area." The first 15 units p.q. per 50 sq ft of assessed area will be at 4d. p.u., the next 20 per 50 sq ft at 2d., and all over at 1¼d. p.u. There is a tariff for late hour shop window lighting, all units used between closing time and 7 a.m. of the next day being charged at 2d.

Under a fixed block tariff for lighting, the first 1,500 units p.q., would be at 4d. p.u., and all additional at 2d. There is also a heating, cooking and power tariff, providing for the first 2,000 units p.q. to be charged at 2d. p.u., and all over at 1¼d. But for separately metered thermostatically controlled storage water heaters there is a flat rate of 1¼d. p.u. An additional tariff for off-peak supplies, provides for the first 1,200 units p.q. to be charged at 1¼d. p.u., and all in excess at ¾d. On all of these tariffs there is a discount of 2½% for prompt payment.

Midlands Board

The new standardised tariffs of the Midlands Electricity Board, which are to take effect from the first meter reading after June 3 next, comprises block tariffs for all except large commercial and industrial premises. For private dwelling houses, there is an allowance of 12 units per room per quarter to be charged at 4d. p.u., and all in excess at ¾d. p.u. Commercial or industrial concerns requiring not more than 50 kVA will be charged 3d. p.u. for the first 40 units per 100 sq ft of floor area p.q., all over being at 1d.

For farming premises (other than the dwelling house), 30 units per 1,000 sq ft of floor area (minimum 4,000 sq ft), will be at 4d., and the excess at 1d. p.u.

The block tariff for combined private dwelling houses and commercial premises provides for 12 units per room for the dwelling side, 40 per 100 sq ft of floor area of the remainder of the premises and 20 per 100 W of installed outside lighting to be charged at 4d. and the remainder at ¾d. There is also a separate tariff for outside lighting, under which the first 20 units per 100 W installed are at 3d. p.u., with all in excess at 1d. p.u.

Under the m.d. tariff for larger commercial premises, each kVA of the first 25 kVA of maximum demand is charged at 10s. per month, and the remainder at 7s. 6d., plus a unit charge of 0·60d., subject to the usual coal clause adjustment. For large industrial concerns there is a charge of 6s. 9d. per month for each kVA of the first 200 kVA of m.d., plus 6s. 3d. for each kVA of the next 300 kVA of m.d. and 5s. 9d. for all in excess, plus 0·55d. p.u. for the first 100,000 units per month with all extra at 0·50d. Again there is the normal coal clause.

In future no meter rents will be charged, the meters being provided and maintained free by the Board, except that for an extra meter installed at the consumer's request, a hire charge will be made.

In releasing these details, the Board has explained that its staff have to find out the number of rooms in about a million houses. This will take place at the meter reading during the next three months. It will be necessary to count the rooms in most of those houses where the fixed charge is already on a room basis, because of the different method of counting. New consumers will pay the new prices immediately after June 3, but the actual date of coming into operation for existing consumers depends on the date the meters are read. When the counting of rooms in private houses is well under way, the introduction of the new commercial and industrial tariffs will commence and proceed as fast as arrangements can be made, but it is likely to take many weeks.

E.D.A. Sales Management Conference

Record Attendance but Less Buoyant Outlook than Last Year

OVER 600 delegates—a record number—attended the E.D.A. Sales Management Conference, which was opened in Caxton Hall on Tuesday morning by MR. H. J. RANDALL, C.B.E., F.C.I.S., companion I.E.E., the chairman of the London Electricity Board.

Congratulating his audience on their courage in attending a conference of this description when the supply industry was passing through one of the most difficult periods in its history, Mr. Randall likened them to modern editions of Mark Tapley, who was always at his most optimistic when the outlook was gloomy. The difficulty which beset the industry was not that sales were falling off, but that they were rising too swiftly, even in the absence of promotional advertising.

It would be an easy and popular step for him to declaim in ringing tones that the industry would not be hampered by restrictions and that their job was to sell more and more electricity, but it would be out of touch with reality. They must, in short, face the stark facts that the generating programme would not provide sufficient for the country's requirements for a period variously estimated at 5-10 years, and even if there were unlimited funds and raw materials available, there were not sufficient manufacturing and civil engineering facilities in the country to overcome the plant shortage immediately.

However, mainly due to the rearmament programme, there was now a shortage of capital as well as raw materials. How serious this was could be gathered from the fact that **unless further capital allocations were made, certain London districts would be forced to refuse new consumers—including new housing estates—for an indefinite period.** Although this seemed a depressing note on which to commence the conference, he must point out that unrestricted sales at the present time could do very great harm to the industrial and domestic life of the country. Power cuts, in addition to their direct effects, were doing great harm to the goodwill which the industry had built up over a long period of years and, unfortunately, it was very difficult to educate the public to an appreciation of the true facts. To keep the public properly informed must be one of their aims in these times. Another must be to ensure that available electricity is used to the best advantage and that apparatus was not installed which merely aggravated peak load difficulties. He himself liked electric fires, they were clean, labour-saving and healthy and short-period use actually economised in coal consumed; but he believed it was against the national interest to install large numbers at the present time. One of their duties should be to scrutinise the installation of all new apparatus which unduly swelled the peak load. This did not mean, however, that the industry should put up its shutters and, like Mr. Micawber, wait for something to turn up, but it did mean that they must perform their public service with discrimination and foresight. Maintenance of goodwill must be their third aim.

In these difficult days, the work of sales management no longer consisted of unrestricted development. Their work called for a wide knowledge of industrial, agricultural and domestic requirements—in fact, they needed the knowledge of encyclopedias, the vision and wisdom of statesmen and the patience of Job.

Electricity and Food

First paper of the conference was "Food Hygiene and the Part Electricity Can Play," by MR. H. T. PERRY, O.B.E., F.S.I.A.

Refrigeration would loom large in the viewpoint of the average man if he were asked his views on this subject, but Mr. Perry, as chief sanitary inspector of Kingston-on-Thames, pursued the subject from a very much wider viewpoint. Remarking that never before had so much attention been focused upon the subject of hygiene in regard to food as at the present day—very little was done after the Food and Drugs and the Public Health Acts of 1875 until well into the present century—he pointed out that the late war caused a revolution in the feeding habits of the public. Of the £250-£700 income group, it was estimated that the percentage of income spent on lunching out rose from 1·4% in 1938 to 3·9% in 1947. There are some 114,500 eating places open to the public, serving 39 million meals per week,

excluding a further 24 million for industrial canteens and 40 million for schools and institutions. To meet this demand new establishments have been opened and old ones enlarged, often without the necessary attention being paid to hygiene.

After referring to the legislative and administrative aspects of food hygiene, Mr. Perry went on to analyse the actual problems involved, from the structural conditions of the premises, through lighting and ventilation, personal cleanliness and storage, and the application of electricity to assist in their solution. Apart from its obvious functions of lighting and ventilation, other applications such as water heating, sterilisation, steam raising, refrigeration, air conditioning, cleaning of premises, washing machines, both for crockery and sterile rags and swabs, hot air driers, furnaces and even magnetic separators and electric detectors and electric furnaces were dealt with. If, as the author pointed out in his opening paragraph, hygiene is the science of healthy living, then electricity can certainly add to the health of the nation, if intelligently applied.

Co-operation

MR. PHILIP HONEY, A.M.I.E.E., of E.D.A., took as his subject "Co-operation with Professional Trade and Other Organisations." Public relations—the cultivation of public goodwill—was one of the industry's greatest tasks, and good P.R. work had never been so important as at the present day, said Mr. Honey. They were particularly important in the case of a public service which was a monopoly and, properly conducted, resulted in a core of informed public opinion more substantial and permanent than that provided by any other form of publicity, and good public relations were achieved when the public came to realise—individually and severally—that they were getting the best service possible under the conditions prevailing.

As a national association representing a nationalised industry, one of E.D.A.'s tasks had always been to keep constantly in touch with those sections of society which might affect the development, prestige, and well-being of the industry. E.D.A. was closely in touch with Government departments and the principal professional trade and social organisations, and much work went on behind the scenes which was never realised by the industry.

Responsible organisations, professional institutions and the like often exerted an influence—sometimes an undue influence—on public opinion, and many pronouncements touching on electricity often received wide publicity, and care was needed to ensure that statements detrimental to the interests of the industry were not loosely made or allowed to pass unchallenged. It was not generally realised that there were more than 1,500 organisations devoted to scientific, artistic, religious or philanthropic causes, or to those of professional, political, commercial or industrial sections of society. It was impossible to cultivate them all—even if it were desirable—but the more important could usefully be contacted, and relations with them extended by help in the way of lectures, film shows or demonstrations. A number of ways in which Area Boards could develop goodwill were dealt with, together with the importance of the personal duty of each member of the industry to act as ambassadors.

The paper concluded with an appendix outlining the aims and scope of a number of the more important bodies whose interests coincided, to a greater or less extent, with those of the electrical industry, grouped under the headings of scientific, professional, trade and industrial, building, agricultural, municipal, educational and social.

THE latter part of Tuesday afternoon was devoted to a showing of new E.D.A. films, including *Magnetism*, *Electricity and Light*, *Domestic Hot Water*, *Electrical Measurement*, and *Boiling and Simmering*, many of which have already been reviewed in the ELECTRICAL TIMES. An interesting American film also seen was *More Power for the American Farmer*, produced by General Electric.

Lighting Development

The first paper of Wednesday's session was "Lighting Opportunities," by Mr. W. Robinson, B.SC., A.M.I.E.E., F.I.E.S., of E.D.A., who emphasised the opinion that the supply industry underrates the importance of the lighting load, and continued neglect will harm the long-term prospects of the industry. The case for lighting development was that, although the supply industry was created around lighting, and it brought in some £50-£60 million a year in revenue—thus engendering the feeling that it could look after itself—there was little doubt that lighting standards were lower than were commercially and technically possible and socially desirable. The pace of lighting development in the U.S. was increasing rather than slowing down, and it was estimated that North America consumed 80,000 million units/year for lighting, equivalent to some 8-10

times British consumption for a population three times as large.

The position in Britain seemed to be that lighting had settled down at an artificial saturation level determined not by what people ought to have and, in fact, could have, but what they were accustomed to, and there was a great opportunity waiting to be seized. Lighting loads, besides commanding a good price per unit, would steadily improve the load factor if developed on sound lines. Lighting development could be carried out with a very small capital outlay per consumer.

Nation-wide lighting service to individual consumers, he considered, could only be given by the supply industry, since manufacturer's promotion could rarely extend outside the electrical industry, the professions and large users. It was, however, emphasised that the efforts of all sections of the industry should be complementary.

Scope

Dealing with the scope for development, Mr. Robinson quoted a survey made in 1942, which showed that of 12,000,000 homes, one-third were using lamps of lower power than before the war. Kitchen lighting was poor—only 2% used as much as 75 W, while 34% were content with 25 W. One-half of the total number of kitchen-living-rooms had only one lamp while 50% or more used less than ½ W per square foot. Lighting consumption was, in fact, approximately equivalent to one electric kettle, in the average household. The general adoption of the very modest recommendations in the D.S.I.R.'s report (Post War Building Studies No. 12) would greatly increase domestic lighting consumption, while the higher income groups could be approached on the basis of lighting as an amenity.

In the industrial field it was pointed out that out of 200,000 factories, only a small proportion was adequately lit, and a useful basis for immediate promotion would be the 6 ft.-candles minimum of the Factories Act, with the I.E.S. recommendations as the eventual target. The opportunities for commercial lighting development needed no stressing, but street lighting with its high capital outlay of public money per kW of load did not present the same opportunities.

Methods of development were then discussed, from the standpoint of showroom promotion and outside sales, it being emphasised that no field was so little understood as domestic lighting, or offered the same scope for service. Lighting education for supply staffs was very necessary and, in addition to courses run by the Boards and the Lighting Service Bureau, there was room for an extension to cover the field of lighting sales rather than lighting practice. A suggested syllabus was put forward and emphasis was laid on the necessity of avoiding treating the subject as a "poor relation" of appliance sales. In the end lighting education resolved itself into encouraging an interest in lighting for its own sake.

Co-operation in Development

Previous lighting campaigns had failed to have any lasting effect because of lack of effective follow-up. When the supply industry was organised to give lighting service to all classes of consumers, the way would be open for campaigns and publicity, but it was futile to build up a demand for advice which could not be satisfied.

Considering the retail trade, Mr. Robinson outlined the policy prevalent in the U.S. where retailers looked to supply authorities for assistance in selling equipment and the supply authorities looked to retailers for assistance in selling load, and had little regard for trading turnover.

The public authorities, notably schools and Government bodies, were two other fields in which the supply industry had much to offer.

Mr. Robinson concluded his paper with a review of promotion as affected by various types of lamps, including silica coated, tubular (architectural), and fluorescent, both with standard ballasts and with tungsten ballasts. The opportunities available in built-in lighting were also stressed.

Farming and Education

Contributions made by electricity to agriculture were dealt with by Professor H. G. ROBINSON, M.SC., Director of the School of Agriculture in Nottingham University, in a paper, "Agriculture Education and Electricity,' in which he stressed the necessity for a knowledge of farming and the farmers' problems on the part of Area Boards staffs—it was not sufficient merely to talk the farmer's language.

The last session on Wednesday, was devoted to a lecture on "Effective Speech," by Mr. Arthur Duxbury (Principal of the Duxbury Institute).

Papers to be read today include "More Mechanical Handling as an Aid to Productivity," by Mr. L. Langdon Goodman, B.SC., A.M.I.E.E., A.M.I.Mech.E., and "Radio Frequency Heating," by Mr. R. Smith, B.SC., A.Inst.P. (G. E. C. Research Labs.). Tomorrow will be devoted to a general discussion and the Conference lunch.

A Full Year's Work

. . . . the many activities of the Institution both at home and abroad have been maintained and indeed extended . . . . .

states I.E.E. in its Annual Report

EVIDENCE of the importance and standing of the Institution of Electrical Engineers in British public affairs abounds in the Report of the Council for 1950-51, which was presented to the Institution at the 79th A.G.M., held at Savoy Place on Thursday last. Once more it was possible for the introduction to the report to claim that "the many activities of the Institution both at home and abroad have been maintained and indeed extended."

Most of the domestic affairs covered have been described from time to time in these columns, but it is of interest to note that membership has again increased, this year (ending March 31) by 1,010. All classes except that of honorary member, companion and student show a substantial increase, and the total membership reached 36,558, including 17,146 corporate members. During the year under review, a special general meeting of corporate members approved proposed changes in the Institution bye-laws, and after submission to the Privy Council, these became effective on December 12, 1950. The most important changes were in the bye-laws setting out the requirements for entry to the various classes of membership.

Committees

The Institution has been responsible for the setting up, from time to time, of many important committees, and during the year an exhibitions committee was added to these, following an invitation from the B.E.A., area boards and B.E.A.M.A. to establish such a body. Its terms of reference are "to propose, consider suggestions, and co-ordinate arrangements for, exhibitions, whether permanent or temporary, dealing with the history and progress of electrical science and engineering and their applications." An obvious initial field of activity has reference to the Science Museum, at South Kensington.

Work by the wiring regulations committee on the preparation of an abridged form of the I.E.E. Regulations, suitable for installations in single family dwellings, has reached the point where a complete draft is before the committee. The shorter version has been prepared with particular reference to the needs of those engaged in work on building site.

Following the submission, in 1948, of proposals by the joint B.S.I./I.E.E. committee for a revision of El.C.53, it is stated that the Ministry of Fuel and Power is considering promulgation of such a modified document.

Considerable progress has been made by the joint study committee on basic design temperatures for space-heating installations, for which the Institution co-operates with the Institutions of Gas Engineers and of Heating and Ventilating Engineers, and a working sub-committee has been formed to carry out detailed work of investigation. The organising committee convened by the B.E.A. to put forward recommendations for a proposed national inspection council for electrical installation contractors has also reported considerable progress, and its final report is noted as being "expected shortly."

Education

The Institution is interested in education from many aspects and on all levels, and it is obvious from the Council's report that the education and training committee has had a busy and fruitful year. One of the principal problems considered has been the future development of higher education in technical colleges, and on this subject there is profound disagreement with the views expressed in the final report of the National Advisory Council for Education in Industry and Commerce.

Work in connection with national certificate courses in electrical engineering continues, and it is noted that in 1950 there were 474 courses in operation in England and Wales, and that 5,400 certificates and diplomas were awarded or endorsed. Corresponding figures for Scotland were 28 and 306, and for Northern Ireland, 13 and 53. All these totals show an increase on those for 1949.

An important auxiliary activity that has been continued during the year under review is the advisory service on education and training. An increased number of entrants to the profession have been advised about their engineering education and training, and about deferment of military service to allow completion of studies.

Industrial Power

GLASGOW'S *contribution to the* FESTIVAL *opens on Monday in the Kelvin Hall*

A CASUAL visitor, weary after a day's wanderings at the South Bank Exhibition, may think that, with the science display still to come, he has in London the essential parts of the Festival displays. Far from it. Next week the north is to show what it can do with industrial power as a theme, and for a venue the 200,000 square foot Kelvin Hall has been selected.

Eleven sections make up the full exhibition and the first two are combined in an introductory hall which vividly enforces the idea of power on to the consciousness of the visitor. The idea of two forms of power, in fact—of coal and of water. Taking coal first, a cliff of coal, bearing sculptured figures in low relief, surmounts a staircase on the left-hand side of the hall, and leads into the coal section proper. Here, the main idea illustrated is the effect coal has on our lives. Background information on the geology of coal and on mining methods precedes a 16ft lift ride—which seems to visitors a thousand foot drop in a pit-shaft cage. Modern and old-fashioned methods of coal cutting in a four-foot seam are illustrated, and many electrical aids to mechanised mining are on view.

Iron, Steel and Steam

After coal, steel, with a display showing many facets of British production and development in the iron and steel industries. Though the exhibits here have a strong interest for all engineers, there is little of notable electrical importance and it is necessary, in our description to hurry on to the succeeding steam engine section.

Of particular interest here is a boiler house installation broken down to the essential individual components—economisers (Green and Senior), feed-water pump (Weir), a forced draught grate, and an underfeed stoker, various boiler fittings (Hopkinson), a superheater (Sugden) and a control panel (Kent). These components front a 40ft by 20ft coloured perspective diagram, and transparencies of the separate pieces of apparatus will emphasise their mutual importance. Added interest for the visitor is provided by a row of push-buttons, depression of which set appropriate parts of the boiler diagram in motion.

A preview of the section following is provided by a 150 kW steam engine alternator set (Bellis and Morcom), and besides steam prime movers, there is a 2,270 h.p. diesel engine (Mirrlees) and a mock-up of an industrial gas turbine (Ruston and Hornsby).

Electric Power

In the electrical power section our readers will be amongst old friends, and for their greater convenience the story is broken down into three parts—generation, distribution and consumption. Models of turbo-generators will highlight the generation section, with a representation of an 1884 C. A. Parsons' design to show how it all started. Distribution on this occasion includes transmission, and a large model of a 275 kV grid tower (Painter Bros.) provides an effective centrepiece. Round it are transformers and circuit-breakers, including examples by Bruce Peebles, Reyrolle, Ferguson Pailin and English Electric, while an illuminated diagram of the country's transmission system fits the pieces together.

For "consumption" there is another split, this time into industrial and electric. The youngsters amongst the visitors will doubtless find enjoyment in starting by press-button a 250 h.p. electric motor (M.V.), while a typical aid to greater productivity is on view in the form of a rivet heating and upsetting machine (Holden and Hunt).

This is a convenient point in our description to return to the right-hand side of the entrance Hall of Power, and to explore the water sequence. Entry to this is through a glass walled tunnel, over which cascades some 20,000 gallons of water per minute. Methods of controlling and harnessing this by now apparent power of water are shown in the sections that follow, with civil engineering and irrigation first amongst them.

The story of the Nile Valley is chosen to stand as an example of the world-wide feats of British engineering, and the display is presented in three sections. First comes a representation, seen from a distance, of the terrain from the

source of the Nile to the flats of the delta. A moving map of the Nile follows, showing the flooding of the upper regions, the absorbing effect of the Sud Marshes, and the subsequent flooding of the Sudan and Egypt. Last of all is presented an impression of the Nile today, with barrages to control the inundation, new methods of irrigation, and hydro-electric schemes to make use of the power latent in the moving water.

It is the next section, however, that shows in full what can be achieved when electrical and civil engineering skills are combined. To set the story in a human background, the experiences of the North of Scotland Hydro-Electric Board are drawn upon. A croft kitchen with paraffin lamps, oil heaters and petrol stove is contrasted with the same dwelling as it can be when electric power is available.

Full attention is given in all of this to the difficulties involved in using Scottish water power, and particularly to the problem of bringing the water to one spot. A series of bays show the details of the work involved in any hydro scheme, with tunnelling and dam building well to the fore.

Ships and Railways

Both coal and water sequences lead into the Great Hall of the exhibition, where British development of transport is the theme. Ship models of all types of vessels from river ferry to ocean liner are presented in one gallery, with a map of the world behind them, set out to show where British ships sail and what they earn. Of more direct electrical interest is a harbour radar set, which is linked with the Lower Clyde, 20 miles away, and which shows the movements of ships on that stretch of water.

For the land transport display, railways are given pride of place, with both scale and full size models of locos and rolling stock. The models will include one of the Metropolitan Vickers experimental 2,800 h.p. gas turbine electric locomotives built for British Railways, a 480 b.h.p. steel works loco built by the Brush Engineering Co. and an English Electric diesel electric locomotive for Egyptian State Railways.

Appropriately, the exhibition concludes with a glance into the future, and a Wellsian atmosphere is successfully induced with the aid of a Metropolitan Vickers Tesla machine, which produces sparks between a coned electrode set in the factory floor and another arched above it and finished to represent the night sky. The layout of this final hall is aimed at presenting the peaceful application of electrical energy. In furtherance of this idea, there is an attempt to present in readily intelligible form an explanation of the theory of nuclear fission.

The exhibition will be opened on Monday, May 28, by Princess Elizabeth and will remain open daily, except for Sundays, from 10 a.m. to 10 p.m., finally closing on Saturday, August 18. Advance tickets are available, price 3s., while for admission at the turnstiles the charge will be 2s. 6d.

INSTITUTION BENEVOLENCE

PLANS made in 1944 for an I.E.E. war memorial culminated on Friday last in a quietly impressive ceremony, when "The Chesters" Estate was dedicated by the Reverend C. L. Cresswell, Chaplain of the King's Chapel of the Savoy.

In an address delivered in the grounds of the estate, Sir Archibald Gill, president of the Institution, recalled how the idea had been formed of providing some form of residential estate as an extension of the work of the benevolent fund, and as a practical memorial to members who had fallen during the 1939-45 war. The scheme was given an excellent start by Mr. C. W. Speirs, J.P., M.I.E.E., who offered some six acres of ground from his own land at New Malden, Surrey. After various difficulties with building regulations, etc., work was started in August, 1950, on the first eight of an ultimate 26 homes.

Mr. Louis de Soissons and Mr. Kenneth Peacock, two architects with considerable experience of this type of work, were appointed, and they had taken great care that too uniform a style of building was avoided. An attempt was being made to create something of the atmosphere of a small village by arranging the houses, each of which has its own garden, around broad lawns interlaced with avenues of trees.

When Sir Archibald had concluded his address, Mrs. Helen M. Hughes, daughter of Mr. Speirs, unveiled a memorial tablet, and this was then dedicated by Mr. Cresswell. Prayers and a one minute's silence concluded the simple service.

An inspection of typical flats and houses followed, and it was apparent that much thought had been given to providing maximum comfort. There are three-bedroom detached houses as well as two-bedroom detached and semi-detached, and a composite unit of two flats and one house: these in the interest of variety.

Work is now beginning on the second, larger, portion of the estate, and a licence has been granted for four further houses. Already it is apparent that a very fine scheme is being developed, with respect for the spirit of independence of those members of the Institution, and their dependents, who have unfortunately fallen upon hard times.

Problems and Practice

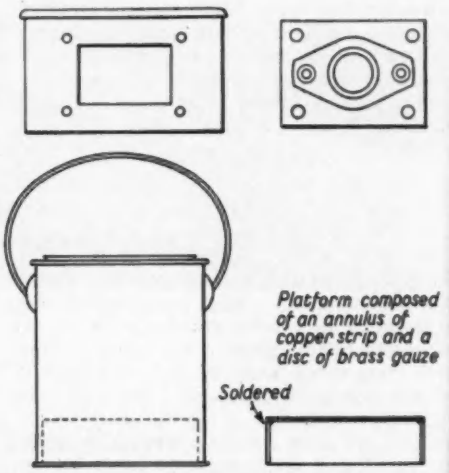
IN ENGINEERING

Saving Maintenance Time

FAILING the brace type of spanner, slot the heads of all breakdown removeable hexagon headed screws on motors and switchgear. A screw-driver can then be used to run the screws out and in, using the spanner for the first and last turns only. Where plant, of a necessity, has to operate in a damp situation, check all nuts and bolts that have to be undone in the event of a breakdown. It will often be found that all such nuts and bolts can be made of dissimilar metals, and so eliminate the risk of rusting solid.

A lot of time can be wasted over disconnecting cables from a faulty motor. Elaborate lugs are often sweated on to the cable ends in the motor terminal box, so rendering it impossible to pull the cables back through the entry hole when the need arises. It is usually possible to adapt a standard lug, and detachable mounting plate as shown on the right. When making insulation tests on motors and switchgear, make use of a large and small crocodile clip, and so avoid the time wasting, and uncertain method of trying to twist a Megger lead round a bolt, etc. It is of little use securing a large crocodile clip to the average size testing flexible, as the weight of the clip soon breaks the flexible at its attachment point. On the other hand, whilst a small crocodile clip will remain indefinitely at the end of the test lead, it is usually too small to grip the usual earthing points. By combining a large and small crocodile clip, an earth connection can be made to any point. The large clip is clipped on first, and the small clip, carrying the Megger lead, is simply clipped on to the large clip. If necessary, of course, the same procedure can be applied to both test leads.

Quite a few manufacturers dismiss fitting and bedding new brushes in a few words. In practice it is not quite so easy. On many motors it is almost impossible to manipulate a sheet of glass-paper when attempting to bed new brushes. The solution is to shape the brush face as near as possible to the correct form before fitting. Here again, the same authorities suggest brush jigs, but they are rarely available for the ordinary motor. In lieu of special devices, the writer had obtained good results by using a small portable motor-driven emery wheel to grind the new brushes to form, the old brushes being removed one at a time, and used as a guide. With a little practice, and working by eye alone, quite a close approximation to the contour of the old brush can be quickly achieved, leaving very little bedding to be done.



Adapted lug, above, and cleaning container, below

Proper marking of cable ends can save endless trouble. Cable colours when new and bright are easily identified, but after the cables have been removed, and replaced a few times by oily hands, confusion often arises, and time wasting testing through has to be carried out. Lugs fitted to cables can easily be marked by stamping with letter and figure punches. If this method is used, avoid the mistake of trying to stamp too large a symbol on a lug. A properly stamped $\frac{1}{8}$ in. symbol, is far more useful than an indistinct $\frac{1}{4}$ in. symbol. Cable ends minus lugs, can be permanently marked by using one of the various proprietary forms of plastic sleeves.

It is an elementary fact that a very small amount of grit, etc., will ruin the working surfaces of ball and roller bearings. Yet when a breakdown involves the dismantling of a motor fitted with ball and roller bearings, the said bearings, in the rush, receive but scant attention. The various caps and races are allowed

to collect all sorts of grit, and frequently the only cleaning they receive before assembly is performed with the aid of a dirty cloth. A portable cleaning container for bearings, can be made from a large tin fitted with a press lid, carrying handle, and an internal platform of coarse gauze, overleaf. Such a container, half filled with paraffin, or petrol, and used in conjunction with a paint brush, enables fixed, or detached bearings to be readily cleaned. The detachable gauze platform in the container keeps the cleaning fluid relatively clean.

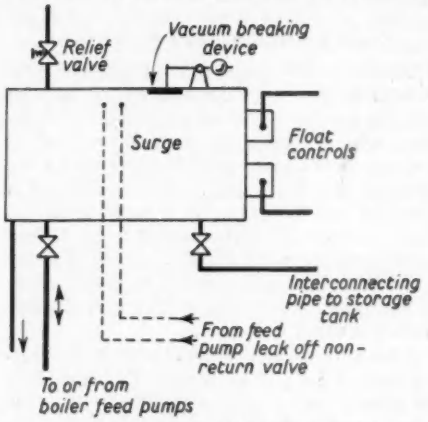
The old saw accusing the cobbler of neglecting his children's footwear, has its counterpart in the electrical world. Many important motors are still installed in dark and inaccessible corners with no individual lighting arrangements. A separately controlled light over the motor, and an adjacent socket outlet should be standardised.—*F. S.*

Runaway Motor

DURING a laboratory test on the performance of a compounded generator directly coupled to a shunt motor, I was taking readings on the motor side when I noticed that the pointer of the field ammeter had suddenly dropped to zero. This was immediately followed by an unusual, growing noise and an increasing rate of speed of the machines, the only thing which could be done was to shut off the supply to the motor. The fault was located as being due to the disconnection of the field and meter terminals, which apparently had been loosely connected and for some reason got disconnected during the test, thus leaving the shunt field on o.c. It is well known that if such conditions were allowed to persist and no automatic protection devices were provided, the machines would have theoretically reached infinite speed; but actually this speed is never attained, and at a much lower speed than the whirling speed of the combined shafts, rotors and coupling system, this, of course, depends on the design of the machines, the rotor windings would be projected out of the slots, resulting in an unbalanced running and torsional vibration, and would be squeezed between the rotor and the pole shoes, thus causing the machines to stop. Apart from the mechanical damages which would be caused to the machines and the bearings, and which could be sometimes a source of danger to the life of the persons nearby, no less harmful damage due to overheating would be done to the windings and specially to the loaded generator, which would be generating an increasing high voltage caused by the runaway speed.—*R. C.*

Vacuum Breaking Device

IN one power plant installation collapse of a surge tank associated with a 30 MW turbo-alternator was experienced. The tank was of the closed type and under certain operating



Details of relief device

conditions a vacuum had been created in the tank resulting in almost complete collapse. To avoid this a weighted valve arrangement was fitted as shown in sketch and no further trouble has been experienced on this particular plant. —*M.I.C.E.*

Shocks at the Butcher's

WE received a call to a butcher's shop where shocks were being received from water pipes, gas pipes and carcases of meat hanging in the shop !

On investigation it was found that a gas geyser was being fitted in the flat over the shop and on finding new gas pipe under floorboards the two ends which had not been joined up were found to have a potential of 200V between the two sections of gas pipe. Further search showed that in threading pipe under floor it rested on the wiring behind ceiling point, which was bare in places and gas pipe was thus alive.

In other section the gas pipe rested against the metal rail fixings in shop which accounted for the carcases hanging thereon being capable of giving the person standing on a tiled floor a quite severe shock.—*D. S.*

Contributions to this page dealing with specific items of interest to electrical engineers and maintenance men are welcome, and, if accepted, will be paid for at our standard rates. Contributions should be written on one side of the paper only and may be accompanied by sketches, which will be re-drawn for publication.

POWER FOR ORKNEY

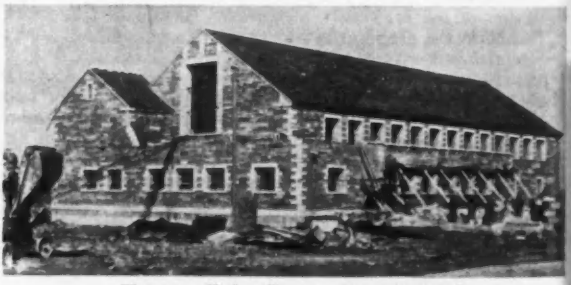
WHAT is to be the largest diesel generating station for public supply in Britain was officially opened at Kirkwall, Orkney, last week by Mrs. Arthur Woodburn, wife of the former Secretary of State for Scotland. Erected for the North of Scotland Hydro-Electric Board, the station has an initial capacity of 3,520 kW, but is capable of housing 10,000 kW of plant. There are now installed three British Polar eight-cylinder, 1,540 h.p. diesel engines, each coupled to Bruce Peebles alternators running at 300 r.p.m., providing 11 kV. To meet the night load, an 800 h.p. Crossley engine, driving a 520 kW Bruce Peebles alternator, will be installed.

Control desks, one for each machine, are adjacent to the switchgear, operation of the generating sets being by remote control. Cooling water is taken from the Peerie Sea, and stored in a tank of 25,280 gallons capacity. All the auxiliary equipment, pumps, transformers, oil coolers etc., are housed in the basement.

Fuel oil is delivered from tankers at a pier a quarter of a mile from the station, via a 5 in. pipe direct to the station's tanks.

Like most industrial premises in Kirkwall, the station is built on land reclaimed from the Peerie Sea. Native Orkney stone was used to give the traditional squared random finish.

At the opening ceremony, Mr. T. Johnston, chairman of the Board, said that since 1948 the Board had connected 55,000 consumers in the Highland area, and 175,000 people were now enjoying something of the amenities of civilisation. That was one third of the Board's potential consumers. In Orkney, 400 farms had been connected since vesting day, and there were 736 electric cookers out of a total of 2,294 domestic consumers.



The new Kirkwall generating station

Safety on the Table

RISKS from portable electric tools have often been the subject of notes in these columns, but seldom can they have appeared as an additional danger to be faced by hospital patients undergoing surgical operation. A recently revised Ministry of Health memorandum draws the attention of hospital authorities to this point, under the title "Precautions against anaesthetic explosions in operating theatres."

The principal electrical risk mentioned is that associated with the question of efficient earthing. Bone saws, drills, etc., are often connected directly to the mains, and the danger exists that the metal case may become live without the knowledge of the operating surgeon, who is protected by rubber gloves and boots. The patient, not so insulated, may receive a fatal shock. Standard precautions recommended are reduction of the tool voltage to 50, regular testing of the full earth circuit by a continuity test set giving a current of at least 10 amp, and routine checking of earth circuit continuity with a dry battery and indicator lamp immediately before use.

Explosion risks arise both from hot surfaces in contact with dangerous gases, and from incendive sparking. Surgical lamps, for instance, must in general be of small dimensions, a fact which has led to the adoption of relatively unrobust construction. Sparking may occur due to accidental short circuiting of exposed terminals, failure of insulation or unsatisfactory switches. It is regarded as very desirable that those concerned with the design, construction, maintenance and use of surgical lamps should realise the explosion risk and endeavour to minimise it.

General Installation

So far as the general electrical installation in operating theatres is concerned, particular attention is drawn to the recommendations in the I.E.E. wiring rules for the earthing of installations in explosive atmospheres. Where flexible cables are necessary, heavy duty t.r.s. is recommended, and plugs and sockets should be interlocked with controlling switches so that plug withdrawal is only possible with the switch off. The use of enclosed mercury type tilting switches is considered as essential within the operating suite.

As was noted last week, two professional electrical engineers are attached to the Ministry of Health staff to advise hospitals on electrical arrangements.

overseas news

Japan's Reorganisation

The Japanese Public Utilities Commission has decided to revise the electric industry reorganisation directive by taking into consideration the views expressed by interested parties in the series of public hearings held recently. We recorded on May 3 that criticism had been made of the directive. Work on the revision has begun, but it has been stated that the P.U.C. intends to add representatives of power consumers to the executive officers of the projected nine power companies. The Nippatsu proposal to reduce the number of executive officers for each of the projected companies to about 10 is considered improper, however, and the Commission apparently has no intention of revising the 1-1 amalgamation ratio between Nippatsu and the nine existing power firms, as the ratio was fixed through talks between the two parties. P.U.C. will also re-study the tentative decision to pay a Y10 premium per stock to Nippatsu shareholders. Nippatsu circles are opposed to that plan, we understand.

Victoria's Dilemma

Faced with the worst power crisis, all consumers in Victoria, Australia, are being urged to reduce consumption by at least 12½% during the coming winter. Restrictions are already in force and the ban on the use of electric radiators has been extended to 7.30 p.m. each day. The State Electricity Commission believes that if industrial and other consumers continue with these self-imposed restrictions, it will not be necessary to reduce production or stand off employees. Meanwhile it is revealed that the States reserve coal stocks have dropped to 85,000 tons, which is about 100,000 tons less than at the start of the 1950 winter. The acting Premier, Mr. Dodgshun, has appealed for co-operation in economy in the use of fuel. The State Electricity Commission is generating 6% more power than at the same time last year, using brown coal and briquettes, oil fuel and a small amount of Callide coal. Mr. R. A. Hunt, chairman of the Commission has explained that two ships had been chartered to bring Indian coal, but they would not leave until August and by the time they arrived the worse of the crisis would be over. Shortage of plant was also a factor in the power shortage, but if the coal were available, the S.E.C. could get through the winter with restrictions little more severe than in previous years.

Co-ordination in N.S.W.

A co-ordinating committee to expedite powerhouse construction was set up in New South Wales earlier this month. The committee, which will also assist in electricity supply problems, was set up at a conference called by the Deputy Premier, Mr. Cahill. After the conference, Mr. Cahill said he would ask the Government to introduce legislation, if necessary, to grant powerhouse construction No. 1 priority for building materials. Power authorities and employer organisations endorsed the decision. Mr. Cahill said that the committee would hasten completion of the new Pyrmont powerhouse and of additions to Bunnerong.

Present schedules provided for the completion of the first unit of Pyrmont by December, but by working round the clock and obtaining all the necessary materials as a top priority it was hoped to be able to complete the job by October. That was now the target date.

Troubles in Sydney, Too

In Sydney, N.S.W., too, the introduction of zoning of power supplies earlier this month has not been without incident. The general complaint seems to be that the zoning system has been applied without active co-operation of industry and commerce who have been selfish in their attitude. Another feature is that because of the development of the inter-connected system, country districts, which have small generating plants usually sufficient to meet their own needs, are now made to share in blackouts arising from the failure of the metropolitan services to meet the demand on them.

Another Tasmanian Plan

A hydro-electric scheme ultimately would be developed in the Huon Valley, Tasmania, beyond Glen Huon to carry an average load of 30,000 h.p. to link with the State's general power network, the State Premier announced at Huonville a few days ago. Surveyors have been busy for some months selecting a site for the construction of a long type of dam to provide power from the Huon river. A geologist's report had been submitted to the Hydro-Electric Commission for perusal, and this is later to be checked by boring. Mr. Cosgrove pointed out that much experimental work would be necessary before developmental activity could begin, and it might be several years before this could be attempted.

B.C. Development

The Provincial Government has approved an extension of the British Columbia Power Commission's John Hart development on the Campbell River. The Commission now has authority to build another dam on Buttle Lake, and install two more tur-

bines, with a capacity of 26,500 h.p., at a cost of over $4,000,000. This extension will raise the project's total generating capacity to 159,000 h.p., but ultimate development to 200,000 h.p. by 1956 is expected.

Ontario's Steam Plant

Rapid progress is reported on the construction of the J. Clark Keith steam power station at Windsor, Ont., for the Hydro-Electric Power Commission of Ontario. The main building is structurally complete, and work has commenced on the installation of the boilers and the first of three English Electric 60 MW alternators. We exclusively reported on March 8 that Mr. E. D. Holdup, formerly station superintendent at Kingston power station, Surrey, has joined the Commission as superintendent at Windsor, while Mr. G. R. Morgan, also previously with the South Eastern Division, is to be responsible for all the Commission's steam plant in the province and in direct charge of the R. L. Hearn steam power station at Toronto. It is expected that the Windsor station will be in operation by the autumn, and the Toronto plant about six weeks later. At Windsor, the control equipment is to be installed next month, when the first coal boat is also scheduled to arrive.

Aluminium & H.E. Power

Decisions to launch immediately a new expansion programme in the Canadian aluminium industry, involving the first stage of a new integrated aluminium development in the remote areas of British Columbia, and construction of another major hydro-electric power plant in the province of Quebec, were announced recently by Mr. N. V. Davis, president of Aluminium Ltd. He said the Canadian developments would be undertaken by its subsidiary, Aluminium Company of Canada, Ltd. Because output of present facilities may be handicapped by power shortages at Shawinigan Falls and Beauharnois, Alcan is going to build a 200,000 h.p. development at Chute Savanne on the Peri-bonka River, below a similar plant recently started on the same river at Chute du Diable. Part of this power will be for existing facilities, and part for new ones to be built immediately, but the Chute Savanne project will not be in operation until early 1953. Cost of the new station is put at $60 millions.

Harnessing the Tiber

The first hydro-electric power station on the Tiber was officially inaugurated last week by President Einaudi at Castel Giubileo, about seven miles north of Rome. It will supply the capital with 70 million kWh a year, while part of the water now brought under control will be used for irrigation. The new station forms part of an ambitious scheme by which water from the Latium lakes of Bracciano, Vioco, and Bolsena and from the Tiber and other rivers will be employed in another 15 hydro-electric stations to produce 1,000 million kWh a year.

New Denmark–Sweden Link

A new experimental current-carrying cable is to be laid across the Oeresund, from Denmark to Sweden, a distance of some six kilometres, later this month. To operate at 132 kV, the cable is of new construction, being flat and measuring slightly more than 14 centimetres across. If it proves successful as a replacement for the existing cable, operating at 50,000 V, it will be used in future planning projects for importing electricity from Norway, we understand. A description of the flat type cable was published in our September 7, 1950 issue.

Bombay Rates Up

Electricity rates in the 106 cities and towns served by thermal stations operated by private companies in Bombay State may be increased by about 33%. The cities include Ahmedabad, Surat, Sholapur, Belgaum, Nasik-Deolali and Broach. Five of the electric supply companies have already raised their rates between 33% to 100% under recommendations of the Rating Committee appointed by the Bombay Government. These companies are: Palghar-Navli, Sinnar, Matheran and Sangamner. Since the increase in costs do not greatly affect hydro-electric projects, consumers residing in areas served by the Tata Hydro-Electric Co. in Bombay are not likely to be called upon to pay any considerable increase in rates yet. A spokesman of the Public Works Department of the Bombay Government has stated that the rates of electricity in areas covered by Government thermal plants may not be increased for some time. In most parts of the country, however, an increase appears inevitable in the light of the sharp rise in costs disclosed by electricity undertakings in their latest balance sheets.

Maraetai Progress

Doubts that the Maraetai hydro-electric scheme would not be ready as hoped in time to end the power shortage before the winter of 1952, were expressed by members and senior officers of the Auckland Electric Power Board after they had inspected that site recently. They were impressed with the progress made since their last visit a year ago but it seemed that much remained to be done. Even those building the station, which was up to schedule until a couple of months ago, were unwilling to hazard a guess as to how long the effects of the recent month-long strike at the works and the prospective cement shortage, may set back completion. The nearby Whakamaru project which was also coming successfully through its early stages, is affected similarly, and in addition has only about two-thirds of the 150 workmen it needs. However, it is not due to generate power before 1954.

PERSONALITIES

IN THE INDUSTRY

The W. T. Henley's Telegraph Works Co. Ltd., has appointed **Mr. T. R. P. Harrison,** B.SC.(Tech.), M.I.E.E., as cable systems engineer. He will be responsible to the chief engineer and is to be concerned with the technical aspects of e.h.v. cable systems. Mr. Harrison received his technical training at the Manchester College of Technology and joined Henley's in the research laboratories at Gravesend, Kent, in 1925. He has specialised in e.h.v. system matters, and has been largely responsible for the development of the Henley High Voltage Research Laboratories. In 1946, he delivered a paper before the I.E.E. on "The Development of the Gas Cushion Cable System for the Highest Voltages" for which he was awarded the Sir John Snell Premium.

Mr. T. R. P. Harrison

The South Western Electricity Board announce the appointment of **Mr. R. W. Steel,** M.I.E.E., chief commercial officer, Area Headquarters, Bristol, to the post of district manager at Bath, vice Mr. A. G. Milne, M.I.E.E., A.M.I.Mech.E., A.M.I.I.A., who is now assistant chief engineer (design) at the Bristol Headquarters.

Mr. R. K. Griffiths, Gradute I.E.E., has recently joined Lancashire Dynamo and Crypto as assistant sales engineer in their London office and will operate in the West London area. Educated at Bromsgrove and Faraday House and after serving in the army throughout the war he joined Johnson and Phillips, Ltd., being engaged on a large contract overseas, and later as a sales engineer in the London area.

Shortly paying a return visit to this country is **Mr. C. G. Abbey,** president of Bepco Canada Ltd., who is due at Liverpool on June 14 in the *Franconia*. Bepco is, of course, a wholly owned subsidiary of Bruce Peebles, Crompton Parkinson, Harland Engineering and Lancashire Dynamo Holdings, and Mr. Abbey is making his visit to consult with the executives of these various companies. During his stay he will also tour the factories concerned. He expects to return to Canada on July 19.

Mr. C. G. Abbey

As we briefly noted last week, **Dr. J. S. Tait,** B.SC.(Eng.)., A.R.T.C., A.M.I.Mech.E., A.M.I.E.E., has been nominated as Principal of the Woolwich Polytechnic and will take up duties in September. At present Dr. Tait is Head of the Electrical Engineering Department of the Northampton Polytechnic, London, where he has reorganised the laboratories for advanced work in the subjects of electronics, telecommunications, and electrical measurements. He is a member of the Board of Studies in electrical engineering of the University of London, and is chairman of the Board of Examiners for the general internal B.Sc. (Eng.) exams., in addition to serving on other committees. Apprenticed with Glenfield and Kennedy, Dr. Tait widened his industrial knowledge with B.T.H. at Rugby, the N.P.L. and during the war emergency acted as control engineer with the C.E.B. in Glasgow. This industrial experience served him well as a member of the Electrical Engineering Committee, and the co-ordinating committee for Engineering, of the Regional Advisory Council for Higher Technological Education in the London area.

Dr. J. S. Tait

Mr. A. W. Kidd, B.SC., A.M.I.Mech.E., M.I.E.E., has been appointed Divisional chief engineer (mechanical and electrical) of the South Western Division of the National Coal Board. Before nationalisation of the coal industry Mr. Kidd was chief electrical engineer of Powell Duffryn Ltd. and since then has been Divisional power generation and supplies engineer.

Station superintendent at the Whitehall Road, Leeds, power station, Yorkshire Division, B.E.A., since January 1945, **Mr. W. Walker** severs his connection there this week-end, retiring after 47 years' service with the Leeds undertaking. For he started as a junior with the Corporation in 1904, subsequently holding various positions. For a time during the 1914-18 war, he served with the R.E.s on a floating power station at Calais. In his younger days he was a successful racing cyclist.

Mr. W. Walker

The General Electric Co. Ltd., has appointed **Mr. O. W. Humphreys,** B.Sc., F.Inst.P., M.I.E.E., Director of the Research Laboratories of the Company He has been the manager of the Laboratories for the past two years, succeeding the late Sir Clifford Paterson. Under Mr. Humphreys's leadership, the expansion of the company's research activities has continued. Additional laboratories have been opened at Wembley and also at Stanmore, and the total staff is now more than 2,000 and the annual expenditure considerably exceeds £1,500,000.

Mr. O. W. Humphreys

Mr. Humphreys is a member of the Councils of the B.E.A.I.R.A., and of the British Non-Ferrous Metals Research Association. He is closely associated with the work of the Institute of Physics and of the I.E.E. and has just been elected a Manager of the Royal Institution. He also serves on various committees of the B.S.I.

The new station superintendent at Barking power station, London Division, B.E.A., is **Mr. J. Harvey,** A.M.I.Mech.E., who succeeds Mr. C. L. Jaques, M.I.Inst.E., M.Inst.F., who, as we reported on May 3, has joined the Eastern Division of the B.E.A. Mr. Harvey took up his new duties last week. For the past year he had held a similar post at Woolwich. He began his career with the Peninsular and Oriental Steam Navigation Co. Ltd., and later spent some time with the undertakings of the Gloucester and Kingston-upon-Hull Corporations before going to the Fulham generating station, where he was turbine house superintendent from vesting day till May, 1950.

Owing to rearrangements in the General Engineering Department of Metropolitan-Vickers Electrical Co. Ltd., several new appointments have been made as from this month. **Mr. W. Eccles,** M.Sc., A.M.Inst.C.E., M.I.Mech.E., A.M.I.E.E., hitherto chief engineer, General Engineering, has been appointed chief engineer, Energy Application Engineering. **Mr. G. H. Jolley,** formerly the M-V Export Company's representative in Malaya, is appointed assistant chief engineer of this new department. The old General Engineering Department has been replaced by two new departments, Electrical General Engineering and Mechanical General Engineering. **Mr. N. R. D. Gurney,** A.C.G.I., M.I.E.E., has been appointed chief engineer, Electrical General Engineering, covering the industrial (including marine), mining and rolling mill sections, **Mr. W. E. Taylor** becoming consulting engineer, Rolling Mills, in this department. **Mr. W. J. Price,** B.Sc., is now chief engineer, Mechanical General Engineering, dealing with power station installations.

Mr. W. E. Taylor

We hear that **Major H. J. Bullard,** M.B.E., A.M.I.E.E., A.M.I.Mech.E., who left England in April 1950 to take up the position of mechanical engineer with the Salisbury Municipal Electricity Department, Southern Rhodesia, has been promoted to senior mechanical and electrical engineer for the undertaking with effect from March 1.

Mr. N. D. Woolnough, manager of the Fakenham service centre of the Eastern Electricity Board, has been appointed manager of the Maldon service centre in Essex. Mr. Woolnough has been at Fakenham since 1947.

Retiring after 33 years service in the industry, **Mr. W. H. Brittain,** district consumers' engineer at Buxton, North Western Electricity Board, was presented with a clock at a little ceremony recently. Mr. Brittain was borough electrical engineer at Buxton at vesting day.

The Minister of Fuel and Power has reappointed the following part-time members of Area Electricity Boards:

North Eastern: **Alderman J. W. Mitchell,** J.P.

North Western: **Mr. Myles L. Haselden,** B.A. (Cantab).

British Insulated Callender's Cables, Ltd., announce the appointment of **Mr. W. C. Handley,** B.Sc. (Tech.), M.I.E.E., as an executive director of the company. His long service with B.I.C.C. began in 1923 when he joined the former British Insulated Cables, Ltd., as technical assistant, cable test department, Helsby. He transferred the same year to the condenser department, and pro-

Mr. W. Eccles

Mr. N. R. D. Gurney

Mr. W. C. Handley

gressively became sales engineer, assistant manager, and in 1941 manager of the condenser department. In 1945 he was appointed director and general manager of the United Insulator Co. (a subsidiary of B.I.C.C.) whilst simultaneously retaining overall responsibility for administration of the capacitor department of B.I.C.C. at Helsby. In 1948 he relinquished departmental duties to become B.I.C.C. liaison officer (subsidiary companies) and joined the boards of many companies in the group. In March, 1950, he became a member of the company's chief executives' committee.

Mr. Percy Ridings

The words of Mark Twain when, on a celebrated occasion, he referred to a report as being "grossly exaggerated," are well applicable to our note last week concerning **Mr. Percy Ridings,** M.I.Mech.E., generation engineer (operation), No. 2 subdivision, North-Western Division of the B.E.A. For our report that Mr. Ridings has retired was incorrect. We tender our apologies for the embarrassment caused him.

Next month sees the retirement of **Mr. E. J. Stewart,** M.A., B.Sc., F.I.E.S., who, since 1936, has been inspector of lighting with Glasgow Corporation, having succeeded Mr. S. B. Langlands in that position. Mr. Stewart has had under his charge some 37,500 public street lamps, of which 26,800 are electric, and 96,000 public stair lights (34,000 electric). He originally started in the Corporation Lighting Department as technical assistant, being subsequently promoted to assistant inspector of lighting, and eventually inspector. Mr. Stewart's successor at Glasgow is **Mr. James M. Ward,** previously assistant inspector, who has had 38 years' service in the Department. Mr. Ward has contributed papers on lighting of streets and common stairs to A.P.L.E. Conferences and to the Scottish Section of the Association.

Colonel R. McCreary, O.B.E., general manager and engineer of Belfast Corporation Transport Department, is to resign. In a lengthy statement released to the Press, he stated that, under the Corporation's new pension scheme, the existing officers must decide by June 30, 1951, whether they wished to come within the scheme. Colonel McCreary has decided against this course, on the grounds that the terms of the new scheme are much less favourable.

Previously deputy station superintendent at Roath power station, Cardiff, **Mr. S. C. Riggott,** A.M.I.E.E., A.M.Inst.F., A.I.Mech.E., has been nominated station superintendent at the Cowes generating station, Isle of Wight, Southern Division, B.E.A. A native of Derby, Mr. Riggott served an apprenticeship in the Laboratory and Test Section of the chief mechanical engineers' department of the L.M.S. Railway, afterwards becoming test assistant there. From 1930 to 1938 he served at Derby generating station, first as station chemist and then as assistant to the boiler house superintendent, after which, until 1941, he was station chemist and combustion engineer at Thorpe power station, Norwich. In 1941 he went to Roath power station as combustion engineer, subsequently taking charge of boiler plant operation and maintenance, and in May 1948 was appointed deputy station superintendent.

Sir Duncan Watson, J.P., M.I.E.E., has retired from his position of administrative director of Duncan Watson (Electrical Engineers) Limited, with effect from May 31, 1951. After that date his London address will be 74 Newman Street, Oxford Street, W.1.

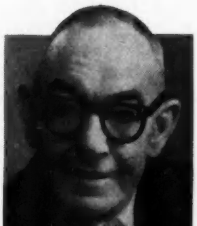
The Midlands Electricity Board announce that **Mr. R. Mallet,** B.A., M.I.E.E., has been appointed sub-area manager of the Worcester and district sub-area of the board. Latterly he has been the board's deputy chief engineer.

OBITUARY

Mr. E. C. Glover, chairman and managing director of Glover Brothers (Mossley) Ltd., died on May 16.

The death occurred a few days ago of **Mr. E. L. Barnes,** aged 56, who, until ill-health forced him to resign two months ago, was deputy chief engineer at Little Barford generating station, Eastern Division, B.E.A. He was formerly with the English Electric Co. at Rugby, and then at the technical office of Edmundson's Electricity Corporation, Ltd., where he was engaged on the design and layout of power stations, including Little Barford. On the completion of that station he was appointed mechanical superintendent there, and later, deputy chief engineer.

We regret to record the death on May 19, of **Mr. W. J. Bensley,** aged 62, deputy managing director of the Sloan Electrical Co., Ltd., who had been in poor health since January. He was president of the Electrical Wholesalers' Federation, for the current year, having been prominent in its activities for a long time. He joined Sloan's in 1907, and rose successively to be Accessories Department manager, London manager, sales manager, and in 1947 joined the board of the company as deputy managing director. His passing will be mourned by his many friends in the industry. The funeral is at St. George's, Beckenham, Kent, on May 24 at 3 p.m.



Mr. W. J. Bensley

Accent on Time

PLANT ENGINEERS' PRESIDENT OUTSPOKEN AT INSTITUTION'S ANNUAL CONFERENCE

PRODUCTIVITY and the plant engineer's part in increasing it provided a subject for Mr. D. Lacy-Hulbert, B.Sc., A.R.I.C., M.Inst.F., at the fourth annual conference of the Institution of Incorporated Plant Engineers. He was speaking after his installation as the fifth president of the Institution, and was not long in getting down to some constructive suggestions. The plant engineer, he opined, was too often called in to consultation at a later stage than he should be, when new machinery and processes were being considered. His best service to industry was given if he was consulted at the design and development stage. Summing up his views neatly, Mr. Lacy-Hulbert suggested that the plant engineer was "the wicketkeeper and not the long-stop."

For the man with plant to look after, the primary measure of productivity was output per machine hour, but allied to this must be a strong sense of the economics of production. It was important that every plant engineer should do his utmost to learn all he could about the financial side of production, to avoid the suggestion that he was advocating the installation of expensive machines which were economically quite out of the question.

There was too much time lost in industry because of neglect of the time element, and the plant engineer could often help here by closer attention to completion promises. In particular, he should pass information on as soon as possible once it was realised that a target date could not be achieved. There seemed to be a growing trend in this direction, which was heartening, but there was still need for considerable tightening up, which would take a long time unless vigorous action was taken by everyone in industry.

Prize Papers

This morning the two prize-winning papers submitted for the Alexander Duckham Memorial Competition are to be discussed after presentation of the medals to the successful authors, Mr. J. Lachlan Sturrock, M.I.Plant E. (silver medal) and Mr. G. E. Halter, M.I.Plant E. (bronze medal). Mr. Sturrock's paper, an analysis on factors involved in the selection of earthmoving plant for public works, has little direct interest for most electrical engineers, but Mr. Halter's somewhat longer contribution will repay study by most electrical maintenance engineers.

He has entitled it "The Plant Engineer—A Study in Responsibility," and in it he speaks, obviously, from experience made fruitful by sharp observation, of many aspects of the plant engineer's job. There is a section on records that should provide useful ideas for many in charge of maintenance departments smaller than that described, and some thoughtful arguments on the advantages of planned maintenance.

Safety

Throughout the paper, the importance of the plant engineer's responsibility for safety is emphasised, and the point is made that a safety officer, where appointed in a firm, usually works in an advisory capacity and as an inspector of the work carried out by the plant engineer. Another idea put over with some feeling is the advantages accruing from allowing a few minutes to representatives of large accredited firms, when they call. Mr. Halter characterises these gentlemen as "pedlars of knowledge," and emphasises that much information and experience can be obtained in return for the courtesy of receiving such visitors.

Touching on research work, there is a suggestion that the plant engineer has many ways in which he can conduct his own private researches. A successful method is for the engineer to compile a list of the black spots in his works, and to attempt an analysis of the cause of trouble. New materials can then be substituted, and a test sheet prepared, with subsequent trials of other materials. Valuable information rapidly builds up from efforts made in this direction.

Turning to labour problems, the author focuses his attention on the difficulties of incentive schemes that do not apply equally to all sections of the work people. For ever before the plant engineer, he says, must be the fact that it is very easy to grant a small concession whether in payment or in conditions, but it is extremely difficult to discontinue such a grant.

Final subjects in this valuable paper are lubrication, welding, workshops and instrumentation. On all of them the author has something challenging to say.

The BUYER'S *Column*

Dorman's Introduce Miniature C.B.

NEW product of DORMAN AND SMITH LTD., Ordsal Electrical Works, Manchester 5, is a miniature circuit breaker designed to give absolute protection for circuits and equipment up to a m.c.r. of 50 amp at voltages up to 500 V a.c., or 250 V d.c.

Dorman's m.c.b.

On ordinary overloads its tripping may be instantaneous or have an inverse time delay characteristic, but in all cases instantaneous tripping occurs on a large overload or short circuit. The mechanism is normally sealed, this prevents interference with the adjustment of settings. Its neutral mechanism has been designed as a separate unit, to be fitted underneath the main unit when required, the total projection being increased by ¾ in. only. Sizes are 5 in. high x 1½ in. wide x 3 in. maximum projection.

Maximum voltage ratings are 500 V a.c. and 250 V d.c., corresponding certified rupturing capacities being 10,000 amp at 250 V d.c.; 10,000 amp at 440 V a.c. at pf 0·62 lag.

Prices and catalogue nos. are as follows :— M.C.B. 1 (5 amp), M.C.B. 2 (15 amp), M.C.B. 3 (30 amp) instantaneous tripping, 23s., and M.C.B. 4 (50 amp) instantaneous tripping, at 25s. 3d., extras included : neutral link, time delay, back stud connecting, quick resetting plunger.

Price Increase

NOTICE received from NETTLE ACCESSORIES, LTD., Harper Road, Wythenshawe, Manchester, is to the effect that as from 21st May all prices are increased by 7½%.

Linolite Decorative Fittings

A LEAFLET recently issued by LINOLITE LTD., 158 Bishopsgate, London E.C.2, giving details of the complete range of decorative fittings which the company make, also includes notes on several new designs just introduced.

Candle lamp fittings in many designs in metal and plastic are for one, two or three plain or twisted candle lamps. Particularly notable in view of their bold but attractive lines, are the types CM.1 and 2. The former is in Beetle plastic in several pastel shades whilst the latter comprises two of the single lamp style (CM1). mounted on a metal base stove enamelled to match.

Another new pattern is the type MH for "Maxtrip 2" lamps. This is a neat switched holder which employs a new safety clip contact designed for operation with the improved peg cap introduced by the lamp manufacturers. It is also moulded in Beetle plastic and is available in many colours.

The "Rotasol" Drive Mechanism

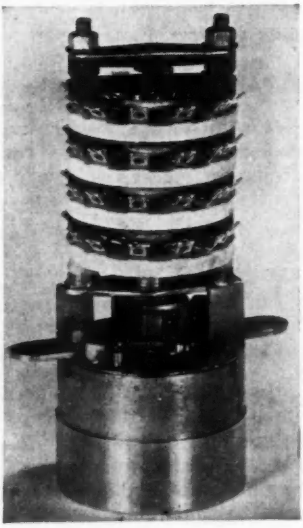
FRESHLY developed by SALFORD ELECTRICAL INSTRUMENTS LTD., Peel Works, Silk Street, Salford 3, the "Rotasol" semi-rotary drive mechanism is an electro-magnetic impulse motor.

Torque is inversely proportional to the total length of the rotary stroke, i.e. an instrument which produces a starting torque of 2 lb/in. with a 40° stroke will, under identical conditions, develop a starting torque of almost 4 lb/in. if it has a 20° stroke.

The general-purpose "Rotasols" have been designed with a 30° stroke, but this may be varied to conform to the type of operation under consideration. Three types have been developed, but all use the same basic motor.

Type 2, Mk. 1B mechanism consists of an assembly of rotary or wafer switches driven by a "Rotasol." The mechanism may be operated at between 8 and 14 impulses per sec. These have a make/break ratio of 1 : 2. A ratchet and pawl mechanism incorporated in the wafer assembly transmits power to the rotor shaft and a spring returns the armature when the energising current is interrupted.

Type 2, Mk. IIB is arranged so that the ratchet and pawl mechanism is inoperative. The rotors



Salford E.I. quite rightly claim that their new "Rotasol" unit, in addition to its positive control of multiple coupled circuits, provides a reserve of mechanical power for the performance of many operations other than switching

are caused to return with the armature when the operating coil is de-energised.

Type 2, Mk. IIIA takes the form of the Mk. IB, but has the additional facility in that it can be "homed" to cancel a previous rotor setting. This is accomplished by the addition of an interrupter spring assembly. By using one wafer of the group as a "homing bank" and by connecting the "operate" circuit by means of its interrupters, the mechanism may be self-stepped very rapidly back to a datum position. The interrupter springs may also be used to connect the equipment as a "circuit hunter," so that the rotors hunt for a particular wafer outlet which has been marked with an electrical condition, e.g. an "earth."

Above are Elga toasters and the Electro-Strip paint remover

Left are some Candlewick heating pads

News from Falks

KEEPING up with their reputation, FALK STADELMANN AND CO., LTD., 91 Farringdon Road, London E.C.1 were alive to the especial opportunities of this year's British Industries Fair.

They chose the Fair as the appropriate time and place for the introduction of several new, interesting and useful appliances.

Among these were the Playfair vacuum cleaner, a lightweight handy cleaner which combines the advantages of the hand duster type with the performance of the heavier orthodox floor type. Complete with tools the Playfair retails at £12 15s.

The Electro-Strip paint remover at 78s. presents an entirely new approach to paint stripping, the disadvantages of the blow-lamp and chemical removers have gone.

The "Honeycomb" three heat blanket at £11 6s. is designed to give warmth conveniently and comfortably when required.

A modified "Auto Perc" coffee maker is now available at £6 12s. 6d. This is the well-known "Auto Perc" with a tap for easy serving.

A four slice automatic toaster for commercial use is the "Elga" which with a capacity of approximately 110 slices of toast per hour, means four slices within two minutes done, but not overdone, to a turn. Price is £21.

An Earthing Seal for Cables

WHERE a cable enters into switchgear, fuse units, joint boxes and similar equipment it is frequently necessary to fit a sealing packing around the cable. If these cables are metal sheathed they are required by statute to be earthed.

With these problems in mind CRANE PACKING LTD., Berwick Avenue Trading Estate, Slough Bucks, have developed a form of packing which is capable of providing a perfect seal past which no moisture or other contaminant can penetrate, but which is also a good electrical conductor.

Designated Style SS2E the packing is a semi-plastic bonded material liberally impregnated with a highly conductive copper dust. The material which is prepared by a special process is a development of the company's well known "Super-Seal" packing.

"Stella" Wholesalers

THE STELLA RADIO AND TELEVISION CO. LTD., 9-15, Oxford Street, London, W.1, announce the appointment of the following wholesalers as exclusive distributors for their products :—

Albion Electric Stores Ltd., T. Beadle and Co. Ltd., Brown Brothers Ltd., H. Clarkson, John E. Dallas and Sons Ltd., Downes and Davies Ltd., Drury Radio Co. Ltd., Flinders (Wholesale) Ltd., S. Hathaway and Co. (Liverpool) Ltd., E. W. Hathaway & Co.(Manchester)Ltd.,A. Jones & Co., Midland Auto Components, F. D. Newcombe and Co. Ltd., R. A. Poole (London) Ltd., Selecta (Gramophones) Ltd., Silcocks Brothers (Bristol) Ltd., South Wales Wireless Installation Co. Ltd., Thomson and Brown Bros. Ltd., Thompson, Diamond and Butcher Ltd., E. A. Wood Ltd.

The prices of the first models in the Stella range of radio and television receivers, which we described in our issue of May 3, have now been fixed as follows.

Model ST.100U. Five-valve all-wave table model, a.c./d.c. mains. List price £14 14s. 2d., purchase tax £6 5s. 10d. Model ST.120A. Five-valve all-wave table model, a.c. mains. List price £18 15s., purchase tax £8 0s. 6d.

Model ST.1522U. Twelve-inch c.r. tube table model, a.c./d.c. mains. List price £55 15s. 9d., purchase tax £25 1s. 3d. Model ST.1480U. Twelve-inch c.r. tube console model, a.c./d.c. mains. List price £68 16s. 7d., purchase tax £30 18s. 5d.

TRADE PUBLICATIONS

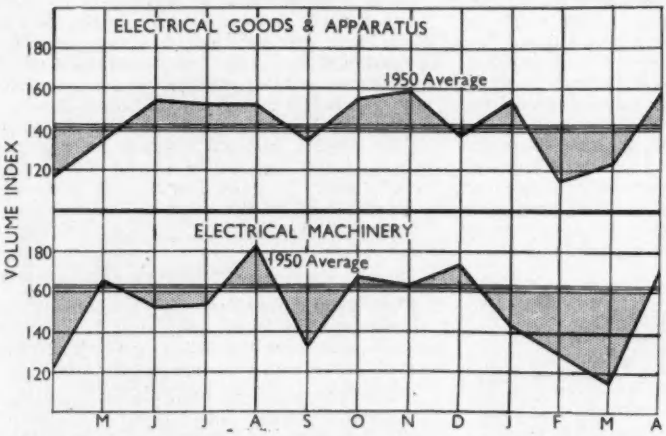
BATTERIES. Nickel cadmium alkaline batteries for marine service made by Britannia Batteries, Ltd., 66 Victoria Street, S.W.1, are featured in a brochure by the firm.

CABLES. Trailing cables for mining purposes, "Glo-clad" wiring system accessories and lead-alloy sheathed cables are described in two new booklets issued by W. G. Glovers and Co., Ltd., Trafford Park, Manchester 17.

OVERHEAD BUSBAR SYSTEMS. Latest brochure issued by the English Electric Co. Ltd., Queens House, Kingsway, London W.C.2, gives an adequate survey of the need for "E.E." systems, especially in the textile industry.

C

EXPORTS AND IMPORTS



EXPORT VOLUME INDEX

Notable increases in exports of both electrical goods and apparatus and of electrical machinery are indicated by the recently issued export figures for April. The electrical goods and apparatus total at £8,326,709, reaches a new high level, but when allowance is made for changes in value, the volume index becomes 159% of the 1947 value, and this has been equalled before.

Electrical machinery figures, at £4,213,044, show a steep rise to the values prevailing last autumn, and this improvement covers all classifications. The volume index, after correcting for changes in prices, is 170% of the 1947 value.

EXPORTS of electrical goods last month reached the record total of £13,183,621, which was some £730,047 more in value than the previous highest month's total—that for August last. The increase over the corresponding figure for March was no less than £3,336,150—a remarkable jump, to which all sections of the industry have contributed. Electrically operated washing machines exported in April amounted to £567,555 in value, while the figure for complete electric power tools was £132,136. In the total for electric cooking and heating appliances, exported irons alone accounted for £74,754 last month.

Description	Exports Value Month of April			Imports Value Month of April		
	1949 £	1950 £	1951 £	1949 £	1950 £	1951 £
Telegraph and Telephone Wires and Cables—						
Submarine	68,213	27,144	71,315	6,292	15,186	4,791
Other	536,198	592,553	700,955			
Rubber Insulated	455,759	202,180	498,173			
Insulated, other than Rubber	981,551	603,349	1,032,634			
Wireless Apparatus, including Valves	949,483	992,790	1,785,185	64,101	128,026	264,711
Telephone and Telegraph Apparatus	1,216,593	1,411,283	1,151,572	—	—	—
Electric Lighting Appliances, Accessories, Fittings and Parts:—						
Filament Lamp Bulbs	107,109	80,572	138,836	10,049	14,692	15,566
Other Descriptions	374,344	284,115	401,674	3,436	14,042	35,486
Batteries (primary)	84,819	98,568	214,102	—	—	—
Accumulators, Portable	226,743	247,631	358,870	—	—	—
,, Stationary	52,824	80,901	71,359	—	—	—
,, Parts and Accessories	96,070	62,644	74,754	—	—	—
Electrical Cooking and Heating Appliances	249,210	215,215	400,484	—	—	—
Ammeters, Voltmeters, etc., and Parts	93,707	101,792	121,007	24,352	42,100	33,689
House Service Meters	130,199	55,579	141,128			
All Other Instruments	74,523	114,367	140,430			
Electro-Medical Apparatus	30,976	34,297	56,619	—	—	—
X-Ray Apparatus, etc.	85,578	62,317	164,206	48,261	54,152	19,993
Insulating Materials	122,343	147,685	210,468	—	—	—
All Other Articles	423,173	378,360	593,938	54,913	95,183	106,476
TOTAL OF GROUP	6,359,415	5,793,072	8,326,709	211,404	363,381	480,712
Electrical Machinery:—						
Generating Sets (Diesel)*—						
Not exceeding 200 kW	1,103,239	456,708	350,555	12,061	35,137	33,628
Exceeding 200 kW		101,362	151,088			
Other Generating Sets		195,809	241,282			
Generators minus Prime Movers, and Parts†		139,885	385,368			
Motors	818,203	622,330	918,765	30,879	32,698	37,433
Convertors, Transformers, Rectifiers, Motor Control Gear, Switchgear, other machinery	1,285,701	1,427,424	2,166,086	10,310	11,111	10,195
Fans, Electrically and Power Driven	120,013	107,124	184,431	—	—	—
Vacuum Cleaners or Electrically Operated Appliances	367,260	262,021	459,337	—	—	—
TOTAL APPLIANCES AND MACHINERY	10,053,831	9,105,735	13,183,621	264,654	442,327	561,968

* 1950 figures include generators minus prime movers. † 1950 figures, for parts of generators only.

THE WEEK

COMMERCE *in news* INDUSTRY

Elexcel Ltd.—The Position

IT has been announced that the factory premises of Elexcel Ltd., manufacturers of "Xcel" cookers and other well-known domestic electric appliances, have been acquired by the Ministry of Supply for other production purposes. Subject to material supplies remaining available, the large Elexcel order book will be executed and efforts will be made to ensure continued production of "Xcel" cookers and the supply of maintenance parts. Negotiations to this end are in hand and include the taking over of world-wide sales activities and specialist staff.

The "Xcel" business was formed 35 years ago and its products have penetrated to some 30 countries. Sales have recently been reaching record levels and it is the hope of the board that as little disturbance as possible will be created by the decision now made. A further announcement is expected shortly.

More Claims for Increased Pay

AN application for a 15% increase in all salaries of the technical staffs of the British Electricity Authority has been made by the Electrical Power Engineers' Association. It is suggested that the increase should apply from July 1 next. We also understand that an application on behalf of the clerical and administrative grades in the supply industry, including showroom staff, etc., has been made by the National Association of Local Government Officers who have asked for a rise of not less than 20%. These requests for increases have been put forward to combat the rise in the cost of living.

Demand more Wages but No Strikes

SPEAKING at the annual conference of the A.S.E.E. at Nottingham last weekend, the chairman, Mr. E. W. Smith, said supervising engineers had every right to complain that their salaries were not keeping pace with the increased cost of living. Although these engineers realised the responsible positions they held in industry, and had been considerate in their approaches for adequate remuneration, the chairman suggested that employers should give immediate consideration to their claims.

Turning to present national and international affairs, Mr. Smith said the demand for both skilled and unskilled labour was so great that there was little unemployment, wages were the highest ever, order books were full, and most important, the standard of workmanship was being maintained. This position was, however, an artificial one, and soon greater difficulties than had ever been experienced hitherto, would have to be faced. Rising costs of living naturally demanded higher wages but there were many who maintained that strikes were the only method of rectifying the balance. Strikes should not be necessary, he said, as objects could be achieved if approached in the right way, but the negotiating machinery must be speeded up.

Mr. Smith referred also to the closed-shop dispute in Durham. While employees should join their appropriate organisations, he said, it was wrong for employers to compel people to join or not to join certain organisations.

Electronics in Manchester

THE sixth annual Electronics Exhibition to be staged by the N.W. branch of the Institution of Electronics, will take place at the College of Technology in Manchester on July 24, 25 and 26. In addition to the usual exhibits, a non-commercial section has been included this year, composed of items from the Universities and Scientific Associations. There will be an exhibition of modern scientific films, sundry demonstrations and the operation over the three days of an amateur short-wave radio transmitter/receiver. Admission will be by ticket obtainable from the branch's secretary, W. Birtwistle, 17 Blackwater Street, Rochdale.

Traders fear Unfair Competition

TWO resolutions concerning the B.E.A. are to be moved at National Chamber of Trade conference which opens at Hastings on Monday. The first

The First Half-Century

The Mechanicals are to be envied in the possession of a home where it is not necessary to shiver and stare at stuffed beasts. Here everything is cosy and an element of the technical is always thrown in, which gives the annual Converzatione an additional *raison d'être*. Only, the invitation card should have included an instruction to members to bring candles in their pockets, for during Sir Benjamin Baker's lecture the light suddenly went out on the lower floor. Those in the lecture room naturally took this as a prelude to the lime light show, but not so the commissionaires at the entrance, who were soon bustling about with oil lamps and lanterns.—*From our issue of May* 23, 1901.

states that the Authority should not be allowed to compete unfairly with retailers and contractors in the sale of electrical apparatus or installation work. Private traders and contractors have repeatedly drawn attention to the possibility that nationalised undertakings might take advantage of their position and carry on business unfairly, but a number of Electricity Boards have given assurances in the past that no such competition has taken place or is intended.

The other resolution, in the name of the Chamber's board, asks the Chancellor of the Exchequer to inquire into the B.E.A.'s hire purchase trading. The aim would be to introduce a limiting factor similar to that operating in respect of traders who have recourse to finance houses.

Lighting in Reference Library

THE designer of the reference library at Battersea Polytechnic could hardly have visualised the perfect provision he made 40 years ago for the new lighting installation carried out in recent weeks by the Polytechnic's electrical staff and Siemens Electric Lamps and Supplies. The curved section of the ceiling above the balcony offered an admirable setting for present-day cornice lighting and a total of 36 5 ft 80 W warm white fluorescent lamps have been fitted in this way. These lamps form the general lighting scheme for the library, but supplementary tungsten drum fittings mounted directly on to the ceiling provide additional illumination. There are three such lamps each of the 300 W type.

Another feature of the installation is the fluorescent lighting provided on each of the tables in the centre of the room by 3 ft, 4 ft and 5 ft fittings. To prevent wastage of power individual table lights may be switched on and off as required. Control gear has been housed in a box under the table. A notable fact about the scheme is that it does not lessen the architectural beauty of the library, with its magnificent oak panelling and stained glass windows, the latter demanding really efficient lighting.

Lighting scheme at Battersea Polytechnic Library where the designer, 40 years previously, made excellent provision for modern lighting methods

No Two Weeks' Holiday for Wiremen

AS revealed at the E.T.U. Hastings conference, the claim for two weeks' annual paid holiday for employees in the electrical contracting industry has been turned down by the National Arbitration Tribunal who decided that the claim "had not at present been established." For the N.F.E.A. it was contended that the cost of the additional holiday claimed would further increase the cost of electrical contracting work, there being no margin of profit available in the industry to meet the extra cost of an extended holiday. Also it must mean a lower annual output at a time when increased output was necessary in the national interest; in this connection it was stated that the already low level of production and the volume of important work on hand had led the Association to bring the question of a return to the 47-hour week before the N.J.I.C. for the industry.

N.A.L.G.O. in Lighter Vein

THE importance of joint negotiating machinery was the theme of most speeches at the annual dinner of the National Association of Local Government Officers, held at the Ironmongers Hall, London E.C. last Friday, when the Rt. Hon. H. Marquand, M.P., Minister of Health, was the chief guest. (N.A.L.G.O., by the way, represents over 30,000 employees in the electricity supply industry in such matters.) The president, Mr. E. L. Riley, added a touch of lightheartedness to which other speakers contributed.

And Mr. David Moffat, director of establishments, British Electricity Authority, drew an amusing picture of Mr. L. Moser, Mr. L. W. G. Hetherington, and Mr. John Davis, supported by Mr. J. H. Warren, general secretary, endeavouring to obtain just that little more for their members! Seriously though he, like others, paid tribute to the work of N.A.L.G.O., and hoped for the continuation of the happy association which had resulted in benefit for both sides.

Fluorescents in the "Oronsay"

CONTINUING their association with the sea and particularly with the Orient Steam Navigation Co., Ltd., Metropolitan-Vickers have installed another large-scale fluorescent lighting system aboard the T.S.S. *Oronsay*. This was the third lighting scheme carried out by Metrovick for the same shipping company since the war. The installation consists of some 1,200 fittings and covers all the public rooms, foyers, shops and a

Our illustration provides an excellent example of the lighting installation carried out by Metropolitan-Vickers aboard the liner "Oronsay." It shows a part of the first class dining saloon

large proportion of first-class cabins. All units comprise mellow lamps and are operated from instant start circuits.

Special use has been made of indirect lighting so as to accentuate the spacious appearance of various parts of the ship—a distinct advantage for ships operating in tropical waters. The main object of designers was to make the installation an integral part, rather than a feature, of the complete decorative effect, and to achieve this, particular attention has been paid to cornice lighting, and to lighting above dropped ceilings. These fittings have been supplemented in many instances by recessed units mounted behind decorative louvres.

Electricity has also been used for space heating on board, and some 600 Thermovent heaters made by E. K. Cole Ltd. have been supplied and fitted. All the heaters have been fitted with double-pole switches and a pilot light. The *Oronsay* is the sixth Orient liner to be fitted with a Thermovent installation.

Sixty Years of Progress

AMONG exhibitors at the "Development Through Industry" exhibition, one of Wolverhampton's contributions to the Festival, held during the fortnight ended May 19, were the Electric Construction Co. and Ever-Ready Co., two of the electrical industry's representatives in that large Midland industrial town. The E.C.C. showed a number of exhibits which dated back to the 1880s. These included a motor from an electric dog-cart built in 1888, indicating instruments and a d.c. plating generator made in 1893. Appropriate contrast was effected by the mounting of the first free-handle d.c. circuit-breaker of 1888 below a D.P. breaker of present-day design.

Also able to delve back into history and the nineteenth century was the Ever-Ready Co., which featured the progress achieved since the manufacture of the dry cell in 1888 to the production of millions of batteries, lamps and receivers for home and export markets in 1951.

Development of New Transmitter

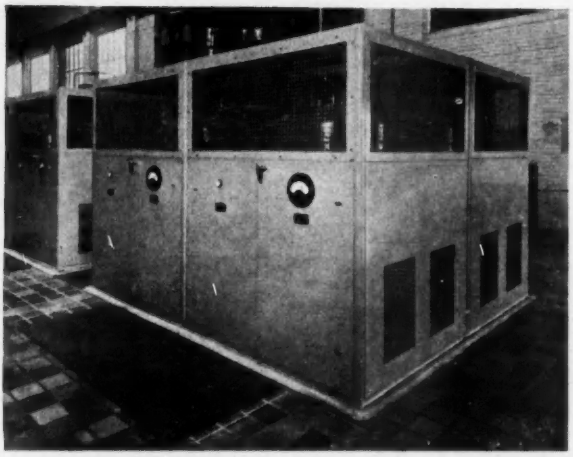
A NEW type of high power air-cooled broadcasting transmitter has now been developed by the Marconi Wireless Telegraph Co. It embodies the perfection of a technique known as "Ampliphase," which allows higher power medium frequency installations to be air-cooled, and greatly reduces size-to-power ratio. Probably one of the greatest advantages of this new technique, in the light of current materials shortages, is that by the elimination of the modulation transformer and reactor, the use of iron and other material has been cut by about 8 tons in a 100 kW transmitter.

Basically "Ampliphase" gives a normal audio modulated carrier by internal phase modulation in the transmitter. Since the phase modulation is affected at a low power level, the audio frequency stages are of low output and contain very few stages of amplification. The radio frequency stages deal only with phase modulated energy and they work at a higher efficiency at all levels of modulation. The result is a high power transmission of great simplicity, electrical efficiency and reliability. To illustrate this, during a trial period only 12½ minutes were lost through breakdown over a broadcasting period of over 2,000 hours.

Tips on Mechanical Handling

AT one time or another factories have to face the inevitable problem of moving goods, whether it be from one part of the works to another, or away from the works to distribution centres. Thus mechanical handling plays an important part in the smooth running of factories and much useful information on the subject can be found in the recently published pamphlet produced by the Anglo-American Council on Productivity. The booklet is a simple compilation based on the findings of the Council's team which toured America. The electrical industry was incidentally, well represented in the party, for among the travellers were Messrs. H. S. Carnegie of English Electric, W. J. Dimmock of Hoover Ltd., and E. G. Taylor of the G.E.C.

The team found that the general standard of materials handling was much higher in the States,



The installation of heavy current mercury arc retifier equipment in the power house of a chemical works where peculiar circumstances necessitated an unusual arrangement

no storage space was wasted and all manner of cranes, forklift trucks, power trucks, pallets and conveyors were used to achieve that end. By extending modern methods the Americans found that a large proportion of men could be released for the production of more goods.

Electricity on the Farm

ENCOURAGED by considerate farm tariffs, farmers in the S.E. Scotland electricity area have shown increased interest during the past year or so in the use of electricity on the farm. This trend has prompted the Board to produce a small booklet, "Electricity on the Farm," dealing with the numerous applications of electricity in that sphere. Additional information is provided in the brochure about service centres and offices of the Board, and attention is especially drawn to the advisory service available to all interested in electrical equipment. The many photographs have been taken specially for the booklet and are all of installations carried out in the area.

Fifty Years of Metrology

ON January 1, 1950, the N.P.L. completed its first 50 years of existence. The proximity of the Festival of Britain, however, caused the Lord President of the Council, Mr. Herbert Morrison, to direct that the Jubilee should be celebrated during this year.

Marking this occasion, a book detailing the history and explaining the work of the N.P.L. has been written by John Langdon-Davis, and published by H.M.S.O., price 4s. Entitled "N.P.L.," the book summarises the work being carried out by the various departments. The information is presented in a readily understandable way and does not go into technical details in an abstruse manner. The explanation of the practical necessity for establishing standards of high accuracy is particularly clear. Numerous photographs serve to illustrate the equipment used, and the volume is thus of considerable general interest.

Novel Arrangement of Rectifiers

AN unusual arrangement of converting equipment is to be seen at a chemical works in N.W. England where rectifiers have been installed by the G.E.C. This company has developed a standard cubicle for mercury arc rectifiers in which a pumpless, air-cooled, steel tank rectifier is mounted in the upper part while the lower section of the cubicle houses all auxiliary apparatus. While this type is suitable for most installations, certain exceptional instances require adaptations of the standard design. One such case was the chemical works where it was necessary to have an uninterrupted view over the plant from the control room floor, and a good circulation of dust-free air. To meet these demands the rectifier auxiliaries were housed in a basement directly beneath the cylinders. Busbars and cable runs were accommodated in this way, being suspended from the underside of the control room floor.

The apparatus consisted of four twin cylinder 500 V heavy current rectifier equipments, each rated at 625 W. The rectifiers were arranged in two groups each group having two pairs of cylinders. As can be seen from the accompanying illustration the lower sections have been made of sheet metal and the upper portions of wire mesh. In addition to the unusual arrangement, the actual installation is notable in that the rectifiers operate directly in parallel with a d.c. generator. Regulation has been arranged to provide for perfect load sharing.

Legal Action over Power Cuts

THE B.E.A., or appropriate Area Boards, may be sued over serious losses suffered by some firms as a result of power cuts. We understand that the National Union of Manufacturers is considering whether or not it should take legal action following a report from its Nottingham representative. Before reaching a final decision in the matter, the union is collecting evidence from various districts in the Midlands where these losses have been sustained. The union has been told that small textile and engineering firms were suffering seriously from constant power cuts which were causing them to fall behind with overseas orders. Some firms, it was said, were on the verge of being forced out of business.

Gas Turbine Week

THE first jet flying-boat, *Saunders-Roe A1*, and the naval MTB 5559 will be prominent exhibits

during a British Gas Turbine Week to be held from June 18 to 23 as part of the Festival of Britain. After landing on the Thames, the flying-boat will be towed up-river to a mooring near the South Bank site. The torpedo-boat is fitted with a Metropolitan-Vickers' gas turbine engine and was the first craft of its kind to put to sea. Viewers will be able to see the craft in action on the river. During the week, prominence will be given to gas turbine items in the exhibition itself, including the showing of "Wonder Jet" at the Festival Telecinema. A gas turbine information bureau will be set up near the Transport Pavilion for the convenience of interested visitors. The week is being organised by the Power Jets (Research and Development) Ltd.

Waste of Money?

THE Parish Council of Ryhill, near Wakefield, owns 69 street lamps and proposes to convert its lighting system from gas to electricity this year. In view of this transformation it was considered expedient to send a delegate to the annual conference of the Association of Public Lighting Engineers at Brighton, where useful knowledge might be gained on the subject. The proposal met with considerable opposition at a recent council meeting and two members walked out of the meeting, protesting that to send a representative was a waste of money. A delegate's expenses were estimated at about £20. The decision of the council to be represented at the conference was taken after discussion on the casting vote of the chairman.

Season of Dinners and Dances

THE season of dinners, dances and theatricals, which usually coincides with the winter months, is by no means over, judging from reports of sundry social events which have reached us in the past week. Ferranti Ltd. held their staff dinner and dance recently at the Midland Hotel, Manchester. The function was attended by Sir Vincent and Lady de Ferranti, and among the guests were the Lord Mayor and Lady Mayoress of Manchester, and the Mayor and Mayoress of Oldham.

Links with the past are always interesting, and a popular event is the reunion of the Marconi Veterans Society, which this year, the fifteenth such reunion, incidentally, was held at Caxton Hall, Westminster. Qualification for membership is 25 years with the Marconi Co. and of the total membership of 2,200 we understand that some 1,900 are still serving. Lunch was the highlight of the gathering, when 160 veterans chatted about the early days of radio with some authority; Mr. C. E. Richard, for instance, was able to tell younger veterans of radio in 1898. At the annual meeting which followed, Mr. W. I. McGhee was elected chairman for 1951-52.

The Y.E.B. entertained members of the N.E. Division of N.C.B., when the latter paid a visit to Barnbrough substation. Hospitality was returned when Y.E.B. officials called at Barnbrough colliery.

NEWS IN BRIEF

Festival Convention dinner of the British Institution of Radio Engineers will be held at the Savoy Hotel on June 28. Vice Admiral the Earl Mountbatten will preside.

The report of the productivity team on non-ferrous metals industry, which visited the U.S. under the auspices of the Anglo-American Council on Productivity, has been published. It is available, from the Council's Offices, 21 Tothill Street, S.W1, price 4s. 6d.

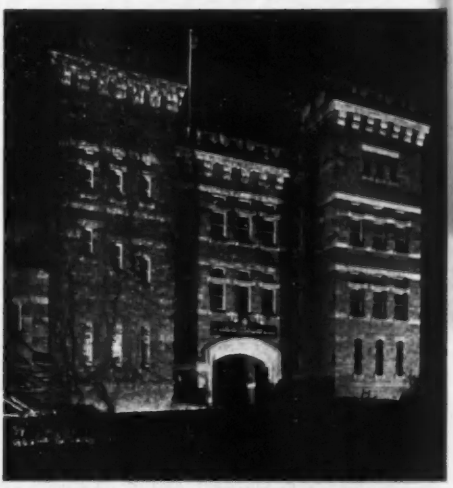
The new laboratories of the Tin Research Institute will be opened by the Duke of Gloucester on Thursday next (May 31). On the following day the laboratories will be open all day for inspection.

The next annual meeting and council of E.I.B.A. is to be held on July 13 at the I.E.E., Savoy Place, W.C.2.

Midlands Electricity Board has bought a large local house at Wellington for administrative use because present offices at Tan Bank are too small.

Falk Stadelmann and Co., Ltd. made good use of the film *Traveller's Joy* in a publicity stunt for their Gadabout travelling iron. Wherever the film was shown they distributed window posters to their dealers pointing out that their iron is also a traveller's joy.

Additional buses were put into commission in Belfast last week to replace the city's trams. The few remaining tram routes are expected to have disappeared by the end of the year. The tram conversion scheme in Liverpool is to be carried a stage further shortly when another six routes will be taken over by buses.



Two Benjamin type "S" 1,500 W floodlights were used to illuminate the Castle Keep (shown above) at the Royal Engineers' Kempston Barracks, Bedford

Electric Supply News

Caithness

The North of Scotland Hydro-Electric Board recently switched on a supply for the first time to the village of Lybster, in Caithness. Initially, supply is given to 25 homes, but shortly a total of 72 premises will be connected. For the scheme the Board had to erect 12 miles of 11 kV o.h. lines, power coming from Wick. Later, a new generating station is to be constructed in the town.

Cumberland

The county council has approved in principle the erection of a 275 kV overhead line in the county area. The matter will be considered further when details are submitted of proposed pylons, etc.

Elton

Cheshire County Council reports the receipt of a letter from the Ministry of Fuel and Power, stating that fullest consideration has been given to the objections submitted by the County Planning committee to the proposed erection of an electricity generating station at Elton in the Chester Rural District, but that in all the circumstances it is considered that the reasons put forward by the County Council against the proposed development are not of sufficient substance to justify the withholding of the requisite planning permission for this most important project. The Minister, therefore, proposes to issue deemed planning permission at the appropriate time.

Hexham

The U.D.C. is to object to the siting of pylons in connection with the new 275 kV line to be erected from Glasgow to Newcastle and which will pass through the Hexham area. The line will be carried on pylons 110 ft high which the council contends will interfere with the area's amenities.

Marchwood

Plans of the elevation of the proposed power station at Marchwood have been approved by the South West Hampshire Area Planning Committee They have recommended the County Planning Committee to place the plan before the Fine Arts Committee. It is proposed to use bricks for the exterior instead of massed concrete. When questions were raised about coal dust, it was stated that a new method would be employed, avoiding the use of an overhead transporter system, to virtually eliminate all dust in moving coal from colliers.

New Stations

The B.E.A. has now received consent for the establishment of two new power stations at Blaydon-on-Tyne, Durham, and an extension of the new Brunswick Wharf station which is now under construction. The two new Tyne plants are to be known as the Stella North and Stella South power stations. The consent for the former covers the installation of four 60 MW turbo generators, four 550 k lb/hr boiler units, and four cooling towers, while the consent for Stella South covers five 60 MW sets and five 550 k lb/hr boiler units.

At Brunswick Wharf station, which is to have an ultimate capacity of 330 MW, the extension consists of a 60 MW turbo-alternator and two 320 k lb/hr boilders.

Portsmouth

Work has been started on the scheme to lay 5½ miles of new gas compression cable from Portsmouth generating station to Wymering. Excavation has been begun through the main streets of the city.

LIGHTING SCHEMES

Ayr.—The Lighting Committee has authorised the re-lighting of Racecourse Road, George Street and Whitletts Road, at a cost of £2,811.

Birkenhead.—The T.C. has been recommended to approve a scheme for re-lighting the main roads in the town, at an estimated cost of £25,000.

Blyth (Northumberland).—The T.C. is recommended to spend £16,500 over three years on electric street lighting. It is proposed to instal 255 sodium lamps. In the first year 107 lamps will be fitted.

Ealing.—The B.C. is seeking M.o.T. approval of scheme for mercury discharge lighting in Eastcote Lane from Sandown Way to Moot Farm Road, Northolt, at a cost of £1,000.

Leeds.—The M.o.T. has approved the installation of 57 sodium vapour and 24 tungsten filament lamps to replace the existing gas lighting on 1½ miles of Dewsbury Road.

Loughborough.—The T.C. is to borrow £9,000 for converting the remaining gas street lamps to electricity.

March (Cambs.).—U.D.C. has approved detailed scheme for improved street lighting, estimated to cost £5,485.

Nuneaton.—It is proposed to improve street lighting in Hinckley Road (A.47), at a cost of £4,234.

Plymouth. The T.C. is recommended to invite tenders for the installation of h.p., m.v. lighting at Woleseley, Alma and Alexandra Roads. Estimated costs are £7,129, £2,863 and £1,568 respectively.

Rolleston.—At the last parish council meeting, the clerk reported that the final scheme, together with the estimated cost for the adoption of electric street lighting in place of the gas, had been submitted for the approval of the Tutbury R.D.C., and subject to this, it was hoped that the conversion would be made in time for the next lighting season.

Company Activities

British Thermostat Co.

Consolidated trading profit for the year to January 31 last, is £363,933 compared with £327,056 for the preceding 12 months. With other income added the total becomes £367,399 (*£329,570*). To directors' remuneration £21,451 (*£18,486*), depreciation, etc. £35,020 (*£29,012*), provision for bad debts £3,000 (*£500*), taxation £176,562 (*£150,360*).

Brush Electrical Engineering Co. Ltd.

Group net profit for 1950, before taxation, is £1,616,670 (*£1,307,485*). Provision for taxation amounts to £940,492 (*£693,103*), leaving a net profit of £667,369 (*£653,878*), of which £616,787 is attributable to the Brush Co. Other provisions and dividends, including final Ordinary of 6%, absorb £579,654, leaving a balance of £37,133 to be added to those of previous years, making that total £91,536. The group net sales turnover for the year was £19,995,431, as compared with £15,570,803 for 1949. The group's current assets are listed at £10,504,877, which includes stocks and work in progress of £5,610,392, and debtors £4,154,391 (*£3,243,342*). Current liabilities amount to £6,509,440 (*£4,914,496*). The group needs further new capital. Notwithstanding the introduction of an additional £800,000 of Ordinary capital within the year and the retention of over £450,000 of the net earnings, the calls on the group's finances to support its expanded activities have involved an increase in the current liabilities. There are also considerable commitments for capital expenditure.

Enfield Cables Ltd.

Group trading profit for 1950, is £437,270 as against £532,590 for the previous year. Depreciation etc., absorbs £71,341 (*£59,917*), group net current assets amount to £1,649,494 (*£1,737,569*). In his statement, the Earl of Verulam, chairman, says the prospect of a further increase in permanent capital, to offset the great expansion in business over recent years, has not been overlooked.

Heatrae Ltd.

Net profit for the year to February 28 last was £9,415, compared with a loss of £246 for the previous year. The dividend is again 12½%.

W. T. Henley's Telegraph Works Co.

Group net profit for 1950 amounts to £685,559 a decrease of £73,024 on the previous year's total. U.K. taxation charged is £731,676 (*£814,402*). There is a final Ordinary dividend of 10%, making 15%, plus 5% cash bonus. The sum of £220,000 (*£255,000*) is placed to general reserve, £200,000 (*same*) to replace buildings, plant, etc., £105,000 (*£25,000*) for fluctuations in prices of materials, and £69,000 is transferred to the staff pension fund.

Metropolitan Electric Cable and Construction Co.

For 1950 the trading profit amounted to £58,851 (*£123,900*). Deducting directors' emoluments, depreciation, etc., totalling £11,305 (*£11,382*), and adding investment income of £2,237 (*£1,479*), the total is £49,783 (*£113,997*), from which taxation of £25,850 (*£52,000*) is deducted, leaving a net profit of £23,933 (*£61,997*). To provident fund £10,000 (*£30,000 to general reserve*), dividends take £4,950 (*same*), leaving £129,934 (*£120,951*) carried forward.

Oriental Telephone and Electric Co.

The group profit for 1950, after allowing all charges, including tax, is £103,303 (*£81,701*). U.K. tax absorbs £39,536 (*£31,024*). The holding company's profit incorporated in the group profit, includes credit in respect of previous years of £6,959 (*nil*), and there is also a special charge of £5,327 debited this year relating to the loss on sales of Government Securities. The final dividend is 12%, making 16% (*same*).

C. A. Parsons & Co. Ltd.

Trading profit for 1950, including investment dividends, etc., is £1,729,695, an increase of £622,670 over the 1949 total. After putting aside £226,545 (*£142,545*) for depreciation of fixed assets, etc., £50,000 (*£60,000*) for contingencies, and £748,000 (*£414,000*) for taxation, the net profit is £656,589 (*£407,475*). The sum of £600,000 (*£450,000*) is transferred to general reserve, and after payment of dividends, including final Ordinary of 1s. 6d. per share, there is a balance of £142,748 (*£147,734*) carried forward. Sir Claude Gibb, chairman, in his statement, emphasises that the 1950 output and sales, both at home and overseas, were again a record, but he issues a note of warning concerning the deterioration in the supply of materials during the past three months. The works have been further extended and a new 74-ft.-high bay, equipped to enable transformers for 275 kV and higher voltages to be manufactured and tested, will come into production this year.

Watford Electric and Manufacturing Co.

It is proposed to raise £50,000 of new capital by issues, comprising 32,000 6% Cumulative Preference shares of 10/- each at par, and 160,000 2/- Ordinary shares at 4/3d. each. Each is available to the respective classes of shareholders in the proportion of two for nine held. Existing capital is £72,000 of each class. The new capital is to finance works extensions. The new Preference will carry dividend from July 1, while the new Ordinary will be entitled to half of any interim and final dividends for the year to December 31 next.

Dividends Declared

Sydney S. Bird & Son. Dividend of 15% (*12½%*). Group profit, after all charges, £13,414 (*£5,834*).

Dictograph Telephones Ltd. Interim Ordinary dividend of 10% (*same*), payable on June 16.

Lisbon Electric Tramways Ltd. Final Ordinary dividend 2½%, making 5% (*same*) tax free.

Commercial Information

CONTRACTS OPEN

HOME

May 25.—Dublin. Supply of 1,500 boxes to hold street lighting relays. City Engineer's Office, 28 Castle St., Dublin.

May 25.—Belfast. Supply and erection of carbon dioxide fire extinguishing equipment for electrical substations. Also of 6,600 V compound filled armour clad switchgear of 250 MVA capacity, during period July 1, 1951, to March 31, 1952. Electricity Dept., East Bridge St. Deposit in respect of first mentioned, £2 2s. (See May 3 issue.)

May 25.—Sheffield. Electrical installation at Totley Hall College for housecraft. W. G. Davies, City Architect, Town Hall, Sheffield 1. Deposit £2.

May 26.—Swansea T.C. Electrical installation in 44 houses at Penlan. Applications by above date to Borough Architect, The Guildhall. Deposit £2 2s. (See May 3 issue.)

May 28.—Bedford T.C. Provision and erection of 120 3/80 W fluorescent lamps, control gear and columns for lighting sundry roads in borough. C. H. Blakeway, Borough Engineer and Surveyor, Newnham House, Horne Lane.

May 28.—Lancashire. Electrical installation in secondary modern school at Maghull and Penwortham girls' grammar school. G. Noel Hill, County Architect, County Hall, Preston.

May 28.—Metropolitan Water Board. Supply and erection of two self-cleansing electrically driven rotary screens at Chingford (Essex) pumping station. Chief Engineer to Board, New River Head, Rosebery Av., E.C.1. Deposit £1 1s.

May 28.—Sowerby Bridge U.D.C. Supply and erection of 58 street lighting columns, lanterns, cut-outs, etc. Alfred Womersley, Clerk of the Council, 23 Wharf St. Deposit £2 2s. (See May 10 issue.)

May 28.—Staines U.D.C. Installation of electricity in 94 houses on Worple Ave. estate. Work includes wiring, lighting points, switches, 5 and 15 amps points. Engineer and Surveyor, Shortwood House, 240 London Rd. Deposit £2 2s. (See May 10 issue.)

May 29.—Belfast. Supply of electrically illuminated traffic signs. Executive Officers' Dept., Police Committee, 84 Chichester St., Belfast.

May 30.—Banstead (Surrey) U.D.C. Erection only of approximately 496 concrete lamp columns, and supply and fixing of 496 lanterns with auxiliary equipment and other incidental works under Class B street lighting. Council's Engineer and Surveyor, Council House, Brighton Rd. Deposit £2 2s.

May 30.—Cork. Supply and installation of vehicle-actuated traffic signals at junctions of Grand Parade and Washington St., Main St. and Washington St., and Langford Row and Infirmary Rd. Tenders to P. Monahan, City Manager and Town Clerk, City Hall.

May 30.—Northampton R.D.C. Electrical installation in 96 houses now being built. R. J. Miller, architect, 1 Cheyne Walk.

May 31.—Barking T.C. Electrical wiring of 65 council houses. Borough Engineer and Surveyor, Town Hall. (Advertised in this issue.)

May 31.—Dublin. Electrical installation in new public health clinic at Crumlin. J. A. Kenny and Partners, consulting engineers, 44 Kildare St., Dublin. Deposit £5 5s.

June 2.—Haslington T.C. Electrical work in erection of 4 houses and 20 flats in Church St., and a block of 8 flats in Bury Rd. James Mason, Borough Engineer and Surveyor, Municipal Offices. Deposit £2 2s.

June 2.— Cambridge. Supply of equipment for conversion from gas to 140W sodium lamps, 406 of each of following : lamps and lanterns, auto transformers, capacitors, control boxes, arm brackets. Application by above date to City Engineer and Surveyor, T.V. Burrows, The Guildhall. Deposit £2 2s.

June 4.—Carluke. Electrical work in block of houses at Law Hospital. Documents from Henry K. Mitchell, secretary, Law Hospital, Carluke.

June 4. — Dorking (Surrey) R.D.C. Electrical work to 3 arches under Station Approach, Horley. Surveyor, Russeldene Church Rd., Horley.

June 4.—Durham. Supply of sundry laboratory and workshop machinery and equipment for Stockton-on-Tees technical college, including electrical engineering motors, generators, transformers and instruments, electricians' tools and equipment. Applications to A. A. Denholm, Director of Education, Shire Hall, Durham.

June 4.—Irvine T.C. Supply of equipment for installation of sodium street lighting along trunk road A.78. Burgh Surveyor, "Heathfield," Kilwinning Road, Irvine.

June 9.—Leeds. Manufacture, supply and erection of following equipment for pumping station at Knostrop sewage works: one 6·6 kV, 400 A, 150 MVA switchboard; one 2 kV, 400 A, 50 MVA switchboard; one ·415/·346 kV, 2,000 A, 25 MVA switchboard; two 1,000 kVA, 6·6/2·0 kV transformers and two 500 kVA 6·6/·415/·346 kVA transformers. Sewerage Engineer's Office, Civic Hall, Leeds 1. Deposit £5.

June 11.—Worthing T.C. Rewiring of electric circuits in approximately 130 houses on S. Farm estate. Borough Engineer and Surveyor, Town Hall. Deposit £3 3s.

June 15.—Oswestry T.C. Provision, erection and wiring of 29 concrete columns, 12 varied brackets and one central suspension fitting, with 42 lanterns and H.P.M.V. lamp, gear, time-switches, etc., on Swansea-Manchester trunk road, Borough Surveyor, Guildhall. (See May 17 issue.)

June 16.—St. Neots U.D.C. Supply and erection of 26 concrete columns, one wall-mounting bracket, 27 lanterns with 140 W sodium lamps, auxiliary equipment and wiring for street lighting on Ipswich-Weedon trunk road A45. L. Henderson, clerk of the council, Council

Offices, Huntingdon St., St. Neots, Hunts. Deposit £2 2s. (See May 10 issue.)

June 18.—Fleet (Hants) U.D.C. Supply of two sets of electrically driven vertical pumps with ancillary equipment, capable of pumping 300 g.p.m. Engineers, John Taylor and Sons, Artillery House, Westminster, S.W.1. Deposit £5.

June 18.—Swinton and Pendlebury T.C. Rewiring for light and power installation, and supply of fittings, at Victoria House, Victoria Park, Swinton. Borough Engineer and Surveyor, Town Hall. (Advertised in this issue.)

June 19.—Halifax T.C. Re-electrification of Sunnyside secondary and primary schools. Borough Engineer, Crossley St. Deposit £1 1s. (Advertised in this issue).

June 25.—Coventry. Electrical installation at Whitley Abbey E.S.N. school. Applications to W. L. Chinn, Director of Education, Education Offices, The Council House, Coventry, by May 31. Deposit £2 2s.

June 26.—Galway. Electrical installation in new regional general hospital at Galway. Work covers mains and switchgear, lighting, service plugs, etc. Consulting engineers, J. A. Kenny and Partners, 44 Kildare St., Dublin C.17. Deposit £26 5s.

Sept. 3.—Dublin. Electricity Supply Board invites tenders for supply, delivery and erection of one 30 MW steam driven turbo-alternator set with condensing plant, feed heating plant and auxiliaries at Ringsend power station. Generation Engineer, 27 Lower Fitzwilliam St., Dublin. Deposit £5 5s. (Advertised in this issue.)

No date stated.—Bristol. Stapleton Hospital Management Committee invites tenders for supply of electric lamps and sundry electrical materials for year ending March 31, 1952. Applications to be placed on list of suppliers should be submitted to D. Pearson, secretary of Committee, 200 Manor Rd., Fishponds, Bristol.

No date stated.—Fort William. Electrical installation in erection of six blocks (total of 26) houses on Claggan site. John A. W. Grant, chartered architects, 36 Melville St., Edinburgh.

No date stated.—Leven. Electrical work in three blocks of houses (eight in all), on Mountfleurie site. Architects are A. D. Haxton and Watson, and L. A. Rolland.

No date stated.—Markinch T.C. Electrical work in 32 houses on Sweetbank site. Applications to A. D. Haxton and Watson, architects, Leven.

No date stated.—Midlothian. Electrical installation in extension to Gorebridge J.S. school and same in 8 houses at Gorebridge. These are separate contracts. County Architect, 32 Palmerston Pl., Edinburgh 12.

OVERSEAS

*Details of items marked * may be obtained on application to Room 1076, Board of Trade, Thames House, North Millbank, S.W.1, quoting reference.*

June 14.—Pretoria. Stores Dept. of S. African Railways invites tenders for supply of large quantities of electrical signalling cable. Quote ref. number C.2910.

June 18.—Uruguay. Administracion General de las Usinas Electricas y los Telefonos del Estado requires supply of 1,200 porcelain insulators for tension of service of 15 kV between phases. Tenders to above at Julio Herrera y Obes 1471.

June 20.—Uruguay. Supply of 20 surge dischargers, line type, for tension service of 20 kV, 20 dischargers of 15 kV and 10 dischargers of 6 kV, required by Administracion General de las Usinas y los Telefonos del Estado.

June 21.—Uruguay. Usinas Electricas y Telefonos del Estado requires two monophase master meters for 1-5-15 amps, 220 V; two triphase meters for 5-10-50-100 amps, 110-220 V; two portable transformers. B.o.T. (Ref. CRE (IB) 59950/51).*

June 22.—S. Africa. Supply and erection of plant for Mbabane Electricity extension scheme comprising one 140 kW hydro-electric generating plant with penstock, power station switchgear, and sundry transformers. Documents from Gvt. Engineer, Mbabane, or from consulting engineers, G. Drewett, Manline House, 17 Harrison St., Johannesburg. Deposit £3 3s.

July 18.—Queensland. State Electricity Commission invites tenders for supply, delivery and maintenance of alternators for each of Longreach, Barcaldine and Blackall Shire Councils. Alternators must have exciter, automatic voltage regulator and all necessary accessories. Purchasers are carrying out d.c./a.c. conversion works. B.o.T. (Ref. CRE (IB) 61071/51).*

July 2.—Portuguese E. Africa. Nine electric motors, 12 b.h.p., 480 V and two electric motors, 14 b.h.p., same voltage, for cranes in use at Port of Beira. Required by Dept. of Ports, Railways and Transport. B.o.T. (Ref. CRE (IB) 60327/51).*

Aug. 3.—Brisbane. Supply and delivery of 200 kVA distribution transformers for City Council. Documents from Manager, Dept. of Electricity, Kelvin House, Adelaide St. Deposit 10s. 6d.

Your Queries — Answered

"Tonum" voltage regulators, makers of? A.H.—J. Stone and Co., Ltd., Arklow Rd., Deptford, S.E.14. (20269)

"Spirod" immersion heaters, makers of? W.H.—Aidas Electric Ltd., Sadia Works, Rowdell Rd., Northolt, Greenford, Middx. (20316)

"Catholier" lighting fitting, makers of? D.A.—Micramatic Ltd., Wootton Mount, Old Christchurch Rd., Bournemouth. (20282)

"Keepalite" emergency lighting batteries, makers of? L.B.—Chloride Electrical Storage Co., Ltd., Grosvenor Gardens House, Grosvenor Gdns., S.W.1. (20291)

"PSC" compressors, makers of? T.E.—Pressed Steel Co., Ltd., Cowley, Oxford. (20298)

"Nico-Caloray" fires, makers of? R.B.—Nico Light Eng. Co., Ltd., 1 Laud St., Croydon, Surrey. (20307)

"Stebull" hairdryers, makers of? T.E.—Stevens and Bullivant, Western St., Spring Hill, Birmingham 5 (20274)

Small incinerators, makers of? F.B.—Barrywald Products Ltd., 62 London Wall, E.C.2; Jackson Electric Stove Co., Ltd., 143 Sloane St., S.W.1. (20326)

The above are selected from questions we have answered this week. If you have a query, send it to us.

CONTRACTS PLACED

Ayr T.C. Supply of 10,000 yd of twin p.i.l.c. and served cable, Scottish Cables Ltd., £2,390.

Bradford. Electric wiring at Dumb Mills, Frizinghall, B.C.S. Electrics Ltd., £4,790.

Carshalton (Surrey). Electrical installation in wards at Queen Mary's Hospital for S.W. Metropolitan Regional Hospital Board, Buchanan Curwen Ltd., £4,670.

Coventry. Electrical work at Parkgate primary school, Electrical Installations Ltd., £4,924; at Alderman's Green primary school, H. Tansey, £2,057; and at Coundon Court primary school, Thompson Electrical Co., £2,235.

Devizes T.C. Supply, erection and installation of 132 street lighting columns, lanterns, etc., G.E.C., £6,520.

Felling-on-Tyne U.D.C. Electrical equipment for 132 houses on Ellen Wilkinson estate, "Z" Electric Lamp and Supplies Co., £2,257.

TRADE MARKS

This information is extracted from the Official Journal by permission of the Controller.

Conyclad. 694,171. Class 9. Insulated electric wires and cables. Connollys (Blackley) Ltd., Blackley Vale Mills, Blackley, Manchester.

"Gibselec." 694,112. Class 9. Junction boxes for use in electric wiring installations. J. W. Gibson, Old George Yard, Cloth Market, Newcastle-upon-Tyne.

Integrity (with design). 693,076. Class 9. Radio and television receiving and transmitting apparatus etc. David Wallace Ltd., 154 Strand, W.C.2.

Lightfoot (with design). 697,032. Class 11. Refrigerating apparatus. Lightfoot Refrigeration Co., Ltd., Abbeydale Rd., North Circular Rd., Wembley.

Magnegraph. 696,028. Class 9. Magnetic sound recording apparatus. Magnegraph Recording Co., Ltd., 38 Hanway St., W.1.

Sunroyle. 696,058. Class 11. Lamps and parts thereof. National Marking Machine Co., Ltd., 16 Sunbeam Rd., Park Royal, N.W.10.

Velvarc. 697,144. Class 9. Electrodes for, and electric arc welding apparatus etc. Arc. Mfg. Co., Ltd., 52a Goldhawk Rd., W.12.

PRICES OF CABLE METALS AND OTHER MATERIALS
(at Tuesday night)

	£ s. d.	New York price
COPPER, electrolytic	210 0 0	£196 0 0
LEAD, good soft pig (foreign)	160 0 0	136 0 0
" " "English" quality ...	161 10 0	
TIN (99-99.75%) ... .. (Cash)	1120-1125	—
" (3 months)	1100-1105	—
ALUMINIUM, commercial purity (del.)	124 0 0	—
ZINC	160 0 0	140 0 0
ARMOURING:		
Galv. Steel Wire (0·104 in.) ...	47 10 0	—
Mild Steel Tape (0·04 in.)	26 10 0	—

TRADE NOTES

B.E.A.M.A. Members. Newly elected members of B.E.A.M.A. are: Denis Ferranti Co. Ltd. (transformer section), and Cable Covers Ltd. (unattached member).

B.E.A.M.A. Contract Price Adjustment Formulae. For purposes of calculating variations in (*a*) "Rates of Pay"—the rate of pay for adult male labour at May 12, 1951 shall be deemed to be 120s.; (*b*) "Costs of Material" the index figure for Intermediate Products last published by the Board of Trade on May 12, 1951, is 386.1 and is the figure for the month of April, 1951.

New Branch Address. The London Electric Wire Co. and Smiths, Ltd. and its associates, Frederick Smith and Co., The Liverpool Electric Cable Co. Ltd. and Vactite Wire Co. Ltd. have removed their Bristol Branch office to larger premises at 10 Narrow Quay, the telephone number remains as before —Bristol 23753. They have also recently opened a new sub-branch at Trinity Mews, Southernhay, Exeter. Telephone: Exeter 55999.

Change of Address. The Canadian School of Electricity has moved to a four-storey building at 1204 Crescent Street, Montreal, Quebec.

Export Agents. Chamberlain Industries Ltd. have appointed the General and Overseas Trading Corporation Ltd., 50 Gresham Street, London E.C.2, to act as their agents in the U.S.A., Egypt, Italy, British West Africa, Tanganyika, Iran, Iraq and Turkey, for their bending machines and other 'Staffa' products.

NEW COMPANIES

Extracted from the Register issued by Jordan and Sons, Ltd., 116 Chancery Lane, London W.C.2.

E. J. Dawes Ltd. to take over business of fluorescent tube manufacturers carried on at Erimus Works, Stockton St., Middlesbrough, by Fredk. W. Cottrell and David Nobbs. Cap.: £4,000. Dirs.: F. W. Cottrell and Mrs. M. E. Cottrell, 1 Grosvenor Rd., Linthorpe, Middlesbrough; and D. Nobbs.

Fraser, Dunn and Co., Ltd., 1 Imperial Bldgs., Addiscombe Rd., Croydon. Electrical, mechanical and aircraft engineers, etc. Cap.: £1,000. Dirs.: Gertrude M. Fraser and E. H. Dunn.

Harkel Construction Co. Ltd., The Poplars, Rein Rd., West Ardsley, nr. Wakefield. Steel erectors, insulation specialists, etc. Cap.: £1,000. Dirs.: to be appointed by Subs. Subs.: J. Kellett and Mrs. H. Kellett.

Hollandia Products Ltd., 37 Soho Sq., W.1. Mechanical, electrical, consultant, research, general and precision engineers, toolmakers, etc. Cap.: £100. Dirs.: Mildred Holland, E. C. Mould, S. L. Lesser and J. B. Jackson.

T.V. Servicing (Acton) Ltd., 171 King St., Hammersmith, W.6. Manufacturers of and dealers in electrical and mechanical apparatus, in particular wireless sets and television, etc. Cap.: £1,000. Dirs.: J. James, The Pines, Stoke Bishop, Bristol, A. Howarth, and F. Farley. Firms of same name and business have also been established at Barking, Bath, Bristol, Gloucester, Kidderminster, Rugby Southampton, Streatham, and Wolverhampton.

Treco Telecommunications and Radar Equipment Ltd., 75 Bedford Ct. Mansions., W.C.1. Cap.: £100. Dirs.: A. Keates and Mrs. G. Evans.

BUSINESS PROSPECTS

HOME

Aberdeen. Additional accommodation to be built at Woodlands Home, Cults, for N.E. Regional Hospital Board. Estimated cost is £50,000, and regional architect is C. C. Wright.

Ayr. Dean of Guild Court has approved following building schemes: 13 shops at Mt. Oliphant Cres., £10,570; 10 shops in Westwood Cres., £13,350; a hall in Peebles St., £6,000; extension of Wallacetown Engineering Co.'s premises, £4,250; and 102 houses at Craigie, £121,340.

Barking T.C. It has been proposed that lighting improvements be carried out in classrooms at Dawson primary schools. Also a £22,000 branch library on Manor estate.

Bath. Plans approved for erection of 44 houses in Freeview Rd.

Belfast. Council recommended to apply for sanction to borrow £32,000 for alterations to "Nismara" to an old people's home.

Bermondsey. Tenders expected to be invited shortly for rebuilding of factory for James Garnar and Sons Ltd. Architects are Alleyn and Mansel, Staple Inn Bldgs., W.C.1.

Beverley R.D.C. Erection of 12 houses at N. Ferriby, 8 at Little Weighton, 6 at Kilnwick, and 4 at Lockington. G. Palfreyman, Engineer, Surveyor and Architect, 36 Market Place, Beverley.

Billericay (Essex) U.D.C. Erection of 6 blocks of flats and 14 houses. The Surveyor, Council Offices.

Blandford Forum T.C. Tenders to be invited for erection of block of 24 flats on Kings Rd. site.

Bolton T.C. Erection of 184 houses and flats on Johnson Fold estate and 4 houses and bungalows on Adrian Rd. estate. Housing Director, Town Hall.

Brigg (Lincs). Plans prepared for new secondary modern school.

Burnham-on-Crouch (Essex) U.D.C. Application to be made for sanction to borrow £8,538 for erection of public hall.

Chatham T.C. Blocks of flats to be built at Jenkins Dale.

Chichester. Tenders likely to be invited shortly for erection of 56 houses on Parklands estate. Council also recommended to approve plans for further 52 houses on same estate, and 2 blocks of flats and maisonettes.

Consett (Durham) U.D.C. Application made for sanction to borrow £83,870 for erection of 60 houses at Moorside.

Coventry. Council is to build 100 houses at Bell Green.

Crosby. Erection of 25 bungalows and matron's house on De Villiers Ave. estate. T. W. Crookdale, Borough Engineer and Surveyor, Town Hall, Waterloo, Liverpool 22.

Down. C.C. to apply for loans for schools at Ballykeigle, £16,500; Crawfordsburn, £32,000, and Kilkeel, £67,500.

Driffield (Yorks) R.D.C. Erection of 46 dwellings on numerous sites. Council's Architect is Fred Vaux, Danesmoor Chambers, 31 Quay Rd., Bridlington.

Dudley T.C. Tenders likely to be invited for installation of electricity in 229 houses.

Durham C.C. has applied for sanction to borrow £513,500 for new schools at Peterlee, Durham Rd., Stockton, Penshaw, High Usworth, and technical colleges in Durham and at Easington.

Essex. Plans approved for erection of grammar school at Hornchurch. Estimated cost, £233,740.

Grantham T.C. It has been proposed to build 22 houses in Harrowby Lane, and 24 houses and 18 bungalows at Cherry Holt.

Halifax T.C. Plans approved for erection of 72 houses at Illingworth. Council is also applying for sanction to borrow £127,717 for erection of 100 houses on Mixenden estate.

Hammersmith. Plans approved for new wing at Wendell Park school. Estimated cost is £50,400.

Hastings. T.C. recommended to approve scheme for auditorium lighting at White Rock Pavilion. Estimated cost, £1,948.

Laoighise (Eire). County Council to build 80 houses at Port Laoighise. Frank Gibney, architect, 29 Merrion Sq., Dublin.

Lewisham. Plans approved for the £99,790 Eliot Place junior and infants' school.

Loughborough T.C. A branch library is to be built on the Thorpe Acre estate.

Maidstone R.D.C. Construction of 18 houses at Nettlestead and 4 flats at Barming. Engineer and Surveyor, Council Offices, 26 Tonbridge Rd., Maidstone.

Newbiggin (Northumberland) U.D.C. has applied for sanction to borrow £46,438 for erection of 34 houses.

Oxford. Council recommended to invite tenders shortly for erection of 98 houses on Freelands Hotel site.

Perth T.C. Dean of Guild Court has approved erection of 198 houses on the Lethan scheme site.

Poplar. Plans approved for erection of 43 houses and 12 flats in St. John's parish area.

Romford T.C. Tenders to be invited for erection of 191 houses on Cross Rd. site, and 70 on Fullers Farm estate.

Stafford R.D.C. Erection of 42 houses on Hixon estate. R. Burdge, Clerk of Council, Council Offices, 7 St. Mary's Grove.

Stanley (Durham). It is proposed to build a hostel at estimated cost, including equipment, of £38,705.

Stevenage (Herts). Erection proposed of £53,390 infants' school at Broom Farm.

Stockton-on-Tees T.C. Negotiations are in hand for erection of 200 houses on the Roseworth estate. Approval received for £104,000 scheme for erection of transport depot.

Tyldesley (Lancs) U.D.C. Construction of 40 houses on Shakerley estate. Engineer and Surveyor, Town Hall.

Uckfield (Sussex) R.D.C. Council to invite tenders for erection of 52 houses.

Vaynor and Penderyn R.D.C. Construction of 30 houses at Trefechan. Gordon H. Griffiths, Council's Architect, 67 Queen St., Cardiff.

Walton and Weybridge U.D.C. Erection of 28 houses on Foxholes estate. Engineer and Surveyor, Council Office, Walton-on-Thames.

Wellingborough U.D.C. Council to erect 76 houses on the Croyland Hall Farm estate at total estimated cost of £99,140.

(*Continued overleaf*)

BUSINESS PROSPECTS
(Continued)

Whitby R.D.C. Tenders being obtained for construction of 30 houses on various sites. Council's surveyor is H. J. Stanworth.

OVERSEAS

India. Mr. G. A. Acharya, director, Bengal Electric Lamp Works Ltd., Calcutta, is anxious to contact U.K. exporters of all raw materials connected with manufacture of electric lamps. He is staying in London at Oddenino's, Regent Street.

Indonesia. Zoro Corporation of Indonesia, Djalan Modjopahit 30, Djarkarta, want to contact U.K. manufacturers of small diesel generating sets and electric motors with a view to their entering into agency agreement.

S. Rhodesia. Messrs. Rhodafrican Agencies, Jameson Hse., 48 Jameson Ave., Salisbury, wish to secure offers from U.K. for following items: bells and fittings, conduit tubing and fittings, flex, wire and cable, fluorescent fittings and parts, fuses, insulators and connectors, lamp globes, ironclad switches and fittings, plugs, sockets, lampholders and adaptors, reflectors, switches and switch-plug combinations, lampshades and lamps, domestic appliances. Director is Mr. R. Broom.

MEETINGS TO NOTE

MONDAY, MAY 28

EXHIBITION OF INDUSTRIAL POWER.—Opens at Kelvin Hall, Glasgow, and continues until August 23.

E.C.A.—Golden Jubilee Conference at Harrogate. Continues until May 30.

I.E.E. (London Measurements Section).—Conference on "Electrical Instrument Design." Continues until May 30.

WEDNESDAY, MAY 30

I.E.E. (Scottish Centre).—Annual meeting at Heriot-Watt College, Edinburgh, 7 p.m.

FESTIVAL SHIP "CAMPANIA."—Arrives at Newcastle and remains open until June 16.

WEDNESDAY, JUNE 6

BRITISH PLASTICS EXHIBITION.—Opens at Olympia, London, and continues until June 16.

BUSINESS EFFICIENCY EXHIBITION.—At Olympia, London. Remains open until June 16.

GAZETTE ANNOUNCEMENTS

COMPANIES ACTS

Electrical Services (Cowley), Ltd. Resolution passed on May 8 for winding-up.

Edgworth Electrics Ltd. Resolution for winding-up passed at meeting on April 29. A. W. Hunter, 185-188 High Holborn, W.C.1, appointed liquidator.

W. G. Hodges Ltd., radio and electrical engineers, Bournemouth, has appointed C. R. Blissett, Waterloo Chambers, Fir Vale Rd., Bournemouth, as liquidator.

Redgrave Engineering Co., Ltd., Bognor Regis. Liquidator appointed is John S. Bradley-Hose, 7 Old Steine, Brighton 1.

Intended Dividend

Luton. Ernest S. Raney, electrical engineer, trading at Coldyhill Lane, Newly, Scarborough. Last day for receiving proofs, May 25. Trustee is W. G. Sisman, 6 The Parade, Northampton.

Winding-up

Lewker Products Ltd., electrical engineers, Putney, S.W.15. At meeting of creditors Official Receiver reported that winding-up order made on April 9. Company formed in 1947, as designers, manufacturers, factors, fitters of and dealers in electrical and radio equipment. Annual income from 14 agreements was about £780 and other assets in Receiver's possession totalled some £265. No statement of affairs had been filed but gross liabilities were expected to amount to about £2,000 against gross assets of about £1,000. Resolution passed for appointment of Mr. D. F. Gay, 39-41 New Broad St., E.C.2, as liquidator, with a committee of inspection.

Joyce Engineering Ltd., Cavendish Sq., W.1, electrical, mechanical and general engineers. At first meeting of creditors it was stated that although trading accounts up to March, 1947, showed net profits for year ended March 31, 1948, there was net loss of £6,731. In following year there was net loss of £2,097, and in 1950 there was a further net loss of £177. For the period to April last a net loss of £1,853 was sustained. Statement of affairs showed liabilities of £16,327, of which £5,700 was due in respect of preferential claims and £10,627 to unsecured creditors. Assets estimated to produce £10,391. Resolution passed for appointment of Mr. T. J. M. MacLeod, 4 Bucklersbury, London E.C., as liquidator, with committee of inspection.

Voluntary Liquidation

Electrical and Sound Services Ltd., Torquay. At meeting of creditors, statement of affairs showed liabilities of £3,239, against assets of £2,620, thus leaving a deficiency of £619. Resolution passed confirming voluntary liquidation of the company with Mr. P. W. Hort, of Messrs. E. T. Collins and Son, 28 Baldwin St., Bristol, and Mr. A. Hawes Richards, 39-40 Fleet St., Torquay, as joint liquidators, with committee of inspection.

Partnership Dissolved

Manchester. S. Lloyd Manuel and Gilbert L. Waterhouse, trading as "Waterhouse and Manuel," electrical engineers, 37 Quay St., Manchester. Partnership dissolved as from May 10. Business continued by G. L. Waterhouse.

BANKRUPTCY ACTS

First Meeting

Warwick. Dennis N. Bateman, trading as "Villiers Electric" at 1 N. Villers St., Leamington Spa. First meeting to be held at Official Receiver's Office, 37 Temple St., Birmingham, on May 30 at 11.45 a.m. Public examination at the Shire Hall, Warwick on July 20 at 11.45 a.m. Date of Receiving Order, May 8.

Wandsworth. Richard Kendall, electrical dealer of 66 Sheen Rd., Richmond. Meeting at 3 Central Buildings, Matthew Parker St., S.W.1, today (Thursday) at 12 noon, and public examination at The Court House, Garrett Lane, S.W.18, on July 13 at 10.30 a.m.

Order On Application for Discharge

Chelmsford. Jacob Barnett and Maurice Barnett, trading as "Barnett Supplies Co.," radio electrical, television dealers and contractors, at 102 and 104c Cranbrook Rd., Ilford. Discharge suspended for two years and that it takes effect as from April 16, 1953.

THERE'S *ALWAYS* ROOM FOR A HENLEY DWARF

LOOK AT IT THIS WAY—

that's pretty good eh! just nine inches from back to front

And see how snugly it fits against that wall! You'll never have any bother finding room for a Henley Dwarf Pillar. If you want to you can build it into the wall and it will still be just as accessible.

If you are not familiar with

HENLEY

DWARF

TYPE

DISTRIBUTION PILLARS

write for Catalogue 22/1.

W. T. HENLEY'S TELEGRAPH WORKS CO. LTD.
51—53, HATTON GARDEN, LONDON, E·C·1

No. 3 . . . Portable Instruments

Representative of Weston portable instruments, is the Model S.103 — a moving iron type of instrument, designed for a wide range of measurements to first grade accuracy on both A.C. and D.C. The 6" scale is linear over the whole of its working range and a knife-edge pointer and anti-parallax mirror are provided to facilitate accurate reading. The instrument is supplied as a Milliammeter, Ammeter or Voltmeter. Full details of the Model S.103 and of the Model S.82—available in D.C., A.C. rectifier and thermocouple types, are available on request.

WESTON
Electrical Measuring Instruments

SANGAMO WESTON LIMITED

Enfield, Middlesex. *Tel: Enfield 3434 (6 lines) and 1242 (6 lines).* *Grams: Sanwest, Enfield*

Branches:
Glasgow, Manchester, Newcastle-on-Tyne, Leeds, Liverpool, Wolverhampton, Nottingham, Bristol, Southampton, Brighton

CLASSIFIED ADVERTISEMENTS

OFFICIAL TENDERS AND APPOINTMENTS

WANTED · FOR SALE WORK WANTED

Those wishing to advertise in these pages should send the text to the Classified Advertisement Dept., Electrical Times, Sardinia House, Sardinia St., London W.C.2, before 10 a.m. on TUESDAY of week of issue. Official Displayed Advertisements are charged at 35s. per inch, and all other classified advertisements at 2s. 6d. per line. Situations Wanted will be published four times for twice the single insertion rate. Fee for Box No. and postage on replies is 2s.

TENDERS INVITED

ELECTRICITY SUPPLY BOARD

DUBLIN

TENDERS FOR TURBO-GENERATING PLANT

THE Electricity Supply Board invites tenders for the supply, delivery and erection of:—

One 30,000 kW steam-driven turbo-alternator set with condensing plant, feed-heating plant and auxiliaries at Ringsend Power Station, Dublin.

Conditions of tendering, forms of tender, conditions of contract and specification may be obtained from the Board's Chief Generation Engineer, 27 Lower Fitzwilliam Street, Dublin C.18, on payment of a fee of five guineas, which will be refunded on the receipt of a bona fide tender. Additional copies may be purchased at a cost of one guinea per copy (non-returnable).

Tenders, with all relevant documents, enclosed in a sealed cover endorsed "Ringsend Station: Tender for Turbo-generating Plant," must be lodged with the undersigned not later than 12 o'clock noon on Monday, September 3, 1951.

The Board does not bind itself to accept the lowest or any tender.

PATRICK J. DEMPSEY,
Secretary.

Electricity Supply Board,
27 Lower Fitzwilliam Street, Dublin C.18.
May 17, 1951. (K 767)

BOROUGH OF SWINTON AND PENDLEBURY

RE-WIRING OF ELECTRIC LIGHTING AND POWER INSTALLATION AT VICTORIA HOUSE, VICTORIA PARK, SWINTON

TENDERS are invited for the re-wiring and supply of electrical fittings at the above.

Specification, form of tender and drawings may be obtained from the offices of the Borough Engineer and Surveyor, Town Hall, Swinton, Lancashire, during office hours.

Tenders, in sealed envelopes provided for the purpose, must be returned to reach the undersigned not later than the first post on Monday, June 18, 1951.

The Corporation does not bind itself to accept the lowest or any tender.

VINCENT COLLINGE,
Town Clerk.

Town Hall, Swinton, Lancs.
May, 1951. (K 800)

COUNTY BOROUGH OF HALIFAX

Education Committee

RE-ELECTRIFICATION OF SUNNYSIDE SCHOOLS, HALIFAX

TENDERS are invited for the re-electrification of the above existing Secondary and Primary Schools.

Plans may be seen and the specification, schedules and form of tender obtained at the office of the Borough Engineer, Crossley Street, Halifax, on the payment of a deposit of one guinea (cheques to be made payable to Halifax Corporation), which will be returned after receipt of a bona fide tender.

Sealed tenders, endorsed "Tender for Electrical Work —Sunnyside Schools," must be delivered to the undersigned not later than Tuesday, June 19, 1951.

The Committee does not bind itself to accept the lowest or any tender.

RICHARD de Z. HALL,
Town Clerk.

Town Hall, Halifax.
May 19, 1951. (K 801)

BOROUGH OF BARKING

Borough Engineer and Surveyor's Department

ELECTRICAL INSTALLATION

TENDERS, returnable by May 31, 1951, are invited for Electrical Wiring of 66 existing Council houses.

Full particulars and form of tender can be obtained upon application to the Borough Engineer and Surveyor, Town Hall, Barking, Essex.

E. R. FARR,
Town Clerk.

Town Hall, Barking.
May 12, 1951. (K 743)

APPOINTMENTS VACANT

BRITISH ELECTRICITY AUTHORITY

North-Western Division

APPLICATIONS are invited for the following superannuable appointments:—

NO. 443. ASSISTANT MAINTENANCE ENGINEER (Mechanical) at Stuart Street Generating Station, Bradford, Manchester 11

The salary, which is provisional pending confirmation by the negotiating body, will be in accordance with Grade 9, Class "H," i.e. £609 to £633 per annum.

Applicants should have had a good technical training, with wide experience in power station mechanical maintenance. The successful applicant will be expected to deputise for the Maintenance Engineer (Mechanical) when required. Ability to plan and progress all boiler and turbine overhauls will be an advantage.

NO. 445. SHIFT CHARGE ENGINEER—Shannon Street Generating Station, Blackpool

The salary will be £563 to £573 per annum, in accordance with Grade 7, Class "D."

NO. 446. ASSISTANT SHIFT CHARGE ENGINEERS at Westwood Generating Station, Wigan (5 vacancies)

The salaries will be £571 to £597 per annum, in accordance with Grade 9, Class "G."

NO. 447. ASSISTANT SHIFT CHARGE ENGINEERS at the new Agecroft (H.P.) Generating Station, Agecroft Road, Pendlebury, Lancs. (5 vacancies).

The salaries will be £571 to £597 per annum, in accordance with Grade 9, Class "G."

NO. 448. STATION SHIFT CONTROL ENGINEER at Willow Holme Generating Station, Carlisle

The salary will be £510 to £530 per annum, in accordance with Grade 10, Class "F."

NO. 449. ASSISTANT SHIFT CHARGE ENGINEER at Ribble Generating Station, Penwortham, Preston

The salary will be £609 to £633 per annum, in accordance with Grade 9, Class "H."

Technical qualification is desirable, and experience in a generating station is essential.

Applications, quoting vacancy number, stating age, qualifications, present position, and giving full details of education and experience, should be received by The Establishment Officer, British Electricity House, Wilmslow Road, East Didsbury, Manchester 20, not later than June 9, 1951. (K 757)

NORTH OF SCOTLAND HYDRO-ELECTRIC BOARD

Shetland Area

APPLICATIONS are invited for the post of ASSISTANT to the Area Manager in Shetland with special knowledge of the operation and maintenance of diesel engines in connection with generation of electricity. Familiarity with public supply conditions desirable. Salary in the region of £700 per annum, depending on qualifications and experience. Superannuation scheme will apply. A house may be available.—Applications to be forwarded to The Secretary, 16 Rothesay Terrace, Edinburgh 3, within seven days of the appearance of this advertisement. (K 742)

BRITISH ELECTRICITY AUTHORITY

Midlands Division

APPLICATIONS are invited for two vacancies of GENERAL ASSISTANT ENGINEER in the Protective Gear Section of the Technical Department. The salary for each of these appointments will be in accordance with Schedule "C," Grade 8, of the National Joint Board Agreement, commencing within the range £437 to £569 per annum according to qualifications and experience, and rising ultimately to £622 per annum.

Applicants should possess either a University Degree or the Higher National Certificate in electrical engineering, and should have spent some time in the electrical manufacturing or supply industry. Previous experience of protective gear will be considered an advantage.

Conditions of service will be in accordance with the N.J.B. Agreement, and superannuation under terms approved by the British Electricity Authority.

Forms of application may be obtained from the Establishments Officer, 53 Wake Green Road, Moseley, Birmingham 13, and should be returned not later than June 2, 1951.

F. W. LAWTON,
Divisional Controller.
(K 693)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

SHIFT CHARGE ENGINEER
STAYTHORPE GENERATING STATION

APPLICATIONS are invited for the position of Shift Charge Engineer at Staythorpe Generating Station, near Newark, Notts.

Applicants should have a sound technical training and practical experience in the operation and control of steam generating plant and switchgear and preference will be given to candidates who have the Higher National Certificate or equivalent qualification.

The salary will be in accordance with Class "J," Grade 7 (£736 to £770 per annum) of the National Joint Board Schedule and the post will be superannuable within the provisions of the B.E.A. and Area Boards' Superannuation Scheme.

Applications should be submitted on the official form which may be obtained from the Divisional Establishments Officer, British Electricity Authority, Barker Gate, Nottingham, and should be returned not later than June 1, 1951.

W. S. BURGE,
Divisional Controller.
May 9, 1951. (K 692)

BRITISH ELECTRICITY AUTHORITY

Southern Division

APPLICATIONS are invited for the position of MECHANICAL MAINTENANCE ENGINEER at Portsmouth Generating Station.

Applicants should have a wide experience in the maintenance of generating station power plant and be capable of taking control of a large maintenance staff, machine shop and supervising turbine and boiler overhauls. A knowledge of the maintenance of instruments will be an advantage.

Candidates should preferably be corporate members of the Institution of Electrical or Mechanical Engineers or have equivalent qualifications.

The conditions of service will be those approved by the National Joint Board and the salary will be in accordance with Class "G," Grade 7, namely £651-£679.

Application forms can be obtained from the undersigned and should be returned to the address given below not later than Friday, June 8, 1951.

P. D. A. OLIVER,
Divisional Secretary.
British Electricity House,
111 High Street, Portsmouth. (K 786)

BRITISH ELECTRICITY AUTHORITY

South Wales Division

APPLICATIONS are invited for the appointment of DRAUGHTSMAN in the Transmission Department, Divisional Headquarters at a salary within the range £375-£536 per annum. This salary is provisional pending negotiation through the National Joint Board.

Applicants should preferably have obtained the Higher National Certificate. Knowledge and experience of substation plant and layout would be considered an advantage.

The appointment is superannuable in accordance with the British Electricity Authority and Area Boards Scheme.

Forms of application may be obtained from the Divisional Secretary at the address below, to whom completed applications should be returned not later than June 8, 1951.

H. V. PUGH,
Divisional Controller.
Cardiff (Pengam Moors) Airport,
Cardiff.
May 11, 1951 (K 735)

SOUTH WEST SCOTLAND ELECTRICITY BOARD

Glasgow Sub-Area

APPOINTMENT OF SECOND ASSISTANT DISTRICT ENGINEER

APPLICATIONS are invited for the position of Second Assistant District Engineer in one of the four Districts in the Sub-Area. The salary and conditions of service will be in accordance with the National Joint Board Schedule "A." The present classification is "F" and the grading is Grade 7, the present salary being £625/£643 per annum. The appointment will be superannuable under the British Electricity Authority and Area Boards' Superannuation Scheme.

Applicants should have had a sound engineering training and subsequent experience with underground h.v. and l.v. distribution systems, including the maintenance and operation of h.v. and l.v. switchgear, fault location on h.v. and l.v. cables and testing and protection gear. Corporate Membership of the Institution of Electrical Engineers or equivalent qualification would be an advantage.

The successful candidate will require to reside within a reasonable distance of District Headquarters.

Applications should be made on forms to be obtained from the undersigned and these should be completed and returned not later than June 9, 1951.

J. CAIRNS,
Secretary.
75 Waterloo Street,
Glasgow C.2. (K 754)

BRITISH ELECTRICITY AUTHORITY

Merseyside and North Wales Division

APPLICATIONS are invited for the appointment of GENERAL ASSISTANT ENGINEERS in the Transmission Department at Divisional Headquarters, Woolton-Liverpool. Salary: N.J.B. Class "AX/CX," Grade 8, £437/£569-£592/604 per annum.

Applicants should possess the Higher National Certificate or similar qualifications and have some experience in the construction, maintenance and operation of 132 kV switchgear, transformers, overhead lines and cables.

The appointments will be superannuable under the terms and conditions of the British Electricity Authority and Area Boards' superannuation scheme, and may be subject to a medical examination.

Forms of application may be obtained from the Divisional Secretary, Clarke Gardens, Woolton, Liverpool, and should be returned to him not later than Saturday, June 9, 1951.

A. R. COOPER,
Divisional Controller.
(K 791)

MIDLANDS ELECTRICITY BOARD

North Staffordshire Sub-Area

APPOINTMENT OF DRAUGHTSMAN

APPLICATIONS are invited for the position of draughtsman in the Stoke Central District of the North Staffordshire Sub-Area.

Applicants should have a knowledge of distribution and sub-station plant alterations and the preparation of plans for statutory notices. Experience in survey work and profile drawings will be an advantage.

The salary, within the range of £350-£450 per annum according to qualifications and experience will be provisional and subject to negotiation with such bodies as may be appropriate.

Applications stating age, education, experience and qualifications should be forwarded within 14 days to Mr. H. A. P. Caddell, Sub-Area Manager, Midlands Electricity Board, 31 Kingsway, Stoke-on-Trent.

A. STEPHENS,
Secretary.
May 8, 1951 (K 734)

MIDLANDS ELECTRICITY BOARD

Shropshire and Herefordshire Sub-Area

APPLICATIONS are invited for the position of DRAUGHTSMAN at the Sub-Area Offices, Shrewsbury. The duties will consist of the preparation of working and detailed plans for sub-station buildings, and switchgear layout. Some architectural experience will be an advantage.

The salary, within the range of £350-£450 per annum, according to qualifications and experience will be provisional and subject to negotiation with such bodies as may be appropriate.

Applications stating age, qualifications, experience and present employment should be sent within the next 14 days to Mr. W. Winwood, Manager, Shropshire and Herefordshire Sub-Area, Midlands Electricity Board, Spring Gardens, Ditherington, Shrewsbury.

A. STEPHENS,
Secretary.
May 8, 1951 (K 733)

MERSEYSIDE AND NORTH WALES ELECTRICITY BOARD

APPLICATIONS are invited for the appointment of JUNIOR WAYLEAVE OFFICERS.

The duties will include negotiation with landowners and tenants for wayleaves for transmission lines, settlement of damage claims, arranging for access for construction, etc., and will be concerned mainly with the North Wales Area. Candidates preferably should have had experience in rural development with an electricity supply undertaking or similar experience, and ability to speak Welsh would be an advantage.

The salary will be within the range of Grade 2 (at present £390-£450 p.a.) of the National Joint Council Agreement subject, where considered necessary, to a probationary period not exceeding six months within the range of Grade 1 (at present £310-£390 p.a.) of that agreement.

The appointments are superannuable and subject to medical examination.

Applications, on forms obtainable from the Manager, Nos. 4/5 Sub-Areas, Electricity House, Rhostyllen, near Wrexham, should be completed and returned to him not later than June 4, 1951.

JAMES RANKIN,
Secretary.
(K 751)

BRITISH ELECTRICITY AUTHORITY

South Wales Division

APPLICATIONS are invited for the appointment of ASSISTANT MECHANICAL MAINTENANCE ENGINEER at Tir John Power Station, Swansea, at a salary in accordance with the Revised National Joint Board Agreement, Class "G," Grade 9 (£571-£597 per annum).

Applicants should preferably have obtained the Higher National Certificate or its equivalent and served a regular apprenticeship.

Sound experience in the operation and maintenance of h.p. and l.p. boilers and turbines would be considered an advantage.

The appointment will be superannuable in accordance with the British Electricity Authority and Area Boards' scheme.

Forms of application may be obtained from the Divisional Secretary at the address below, to whom completed applications should be returned not later than June 9, 1951.

H. V. PUGH,
Divisional Controller.

Cardiff (Pengam Moors) Airport,
Cardiff. (K 787)

BRITISH ELECTRICITY AUTHORITY

Merseyside and North Wales Division

APPLICATIONS are invited for the appointment of JUNIOR ENGINEER in the Hydro-Electric Engineering Department in the North Wales Group Office, Llandudno Junction, North Wales. Salary will be £375-£505 per annum, being Class "AX," Grade 9, of the National Joint Board Agreement.

Applicants should have had a recognised training in civil engineering and general experience of surveying in civil engineering work. Preference will be given to candidates holding a University degree in civil engineering or Associate Membership of the Institute of Civil Engineering.

The appointment will be superannuable under the terms and conditions of the British Electricity Authority and Area Boards' superannuation scheme, and may be subject to a medical examination.

Forms of application may be obtained from the Divisional Secretary, Clarke Gardens, Woolton, Liverpool, and should be returned to him not later than Friday, June 8, 1951. (K 790)

SOUTH EAST SCOTLAND ELECTRICITY BOARD

Southern Sub-Area

APPLICATIONS are invited for the position of THIRD ASSISTANT ENGINEER (Commercial) at Sub-Area Headquarters, Galashiels.

Applicants should have sound theoretical knowledge and practical experience of electrical installations, including preparation of wiring specifications and tenders, and knowledge of I.E.E. and Factory Regulations. Experience in service centre administration, organisation of exhibitions, etc., will be an advantage.

Salary and conditions of service will be in accordance with the N.J.B. Agreement, Class "G," Grade 10 (£539-£550-£561). The appointment will be superannuable under the British Electricity Authority and Area Board's superannuation scheme.

Applications, giving age and particulars of training, experience and positions held, should reach the undersigned not later than fourteen days after the appearance of this advertisement.

G. H. SANKEY,
Sub-Area Manager.

High Street, Galashiels. (K 741)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

STATION SUPERINTENDENT, ST. SWITHIN'S GENERATING STATION, LINCOLN

APPLICATIONS are invited for the position of Power Station Superintendent at the Lincoln Generating Station. Candidates should have a wide experience in the operation, maintenance and administration of an electricity generating station, and the possession of technical qualifications admitting to corporate membership of a recognised professional institution will be an advantage.

The terms and conditions of service will be those approved by the National Joint Board, and the salary will be in accordance with Class "F," Grade 1. The appointment will be superannuable within the provisions of the British Electricity Authority and Area Boards superannuation scheme.

Applications should be submitted on the official form, which may be obtained from the Divisional Establishments Officer, British Electricity House, Barker Gate, Nottingham, and should be returned not later than June 15, 1951.

W. S. BURGE,
Divisional Controller.
(K 794)

BRITISH ELECTRICITY AUTHORITY

Southern Division

APPLICATIONS are invited for the position of SHIFT CHARGE ENGINEER at Poole Generating Station, Hamworthy, Dorset.

Applicants should be in possession of technical qualifications admitting to corporate membership of a recognised professional institution, and preference will be given to candidates who have had previous experience of a large modern electricity generating station with high temperatures and pressures, and pulverised fuel equipment. Manufacturing works experience will be an advantage.

The salary will be in accordance with Grade 7, Class "H" of the National Joint Board's Schedule, at present £692 to £722 per annum.

Forms of application may be obtained from the undersigned and should be returned not later than Friday, June 8, 1951.

P. D. A. OLIVER,
Divisional Secretary.

British Electricity House,
High Street, Portsmouth. (K 788)

BRITISH ELECTRICITY AUTHORITY

Yorkshire Division

SECOND ASSISTANT ENGINEER (CIVIL)—GENERATION (CONSTRUCTION) DEPARTMENT

APPLICATIONS are invited for an appointment as Second Assistant Engineer (Civil) in the Generation (Construction) Department, Southern Group.

Applicants should have educational and engineering qualifications up to the standard required for Associate Membership of the Institute of Civil Engineers, and should have experience in the design and construction of foundations, hydraulic works and heavy buildings.

The commencing salary will be within Grade 2 of Schedule "C" of the National Joint Board Agreement, i.e. £752 per annum to £884 per annum, according to qualifications and experience, rising ultimately to a maximum of £966 per annum.

The appointment will be subject to the provisions of the Authority's Superannuation Scheme.

Forms of application may be obtained from the Divisional Secretary, British Electricity Authority, Yorkshire Division, British Electricity House, St. Mary's Road, Leeds 7, to whom completed forms should be returned within 14 days of the appearance of this advertisement. Envelopes to be endorsed "Second Assistant Engineer (Civil)."

G. A. VOWLES,
Divisional Controller.
(K 748)

THE ROYAL TECHNICAL COLLEGE, GLASGOW

(Affiliated to the University of Glasgow)

DEPARTMENT OF ELECTRICAL ENGINEERING
ASSISTANT LECTURERS

TWO Assistant Lecturers are required for work in electrical measurements: (1) the development and operation of a comprehensive range of precision electrical standards; (2) development of special methods of measurements and control—including electronics—in connection with the general research programme of the department. There are excellent opportunities to work for higher degree.

Candidates should have an honours degree, and preferably some practical experience appropriate to the above duties; salary on scale £450 x £25-£550. Application forms may be obtained from the Secretary, The Royal Technical College, George Street, Glasgow C.1. (K 756)

NORTH WESTERN ELECTRICITY BOARD

APPLICATIONS are invited for the following appointments:—

No. 1 Sub-Area

(Central and South-West Districts)

(a) LINESMEN (OVERHEAD POWER)

Applicants should be experienced in the erection and maintenance of medium and high voltage overhead lines.

The rate of pay will be 35.5d. per hour (£6 10s. 2d. for a 44-hour 5-day week).

(b) LINESMEN'S MATES (OVERHEAD POWER)

The rate of pay will be 31.0d. per hour (£5 13s. 6d. for a 44-hour 5-day week).

The wages and conditions of service are in accordance with the Agreement of the National Joint Industrial Council for the Electricity Supply Industry.

Applications, stating age, present position and wage, and place of employment, should be received by the Sub-Area Secretary, The North Western Electricity Board, Town Hall Extension, Manchester 2, P.O. Box 493, not later than Saturday, June 2, 1951.

No. 4 Sub-Area

METER REPAIRERS (MECHANICIANS), Preston and Blackpool Testing Stations

The wages and conditions of service will be in accordance with the Agreement of the National Joint Industrial Council for the Electricity Supply Industry, the present rate being 36.5d. per hour (£6 13s. 10d. for a 44-hour 5-day week).

Applications, stating age, training, experience and present post, should be received by the Manager, No. 4 Sub-Area, The North Western Electricity Board, 40/41 Lune Street, Preston, not later than Saturday, June 2, 1951. (K 758)

AIR MINISTRY

AIR MINISTRY require MECHANICAL AND ELECTRICAL ENGINEERS for duty in their Works Department in connection with the design, operation and maintenance of ground mechanical and electrical works services on R.A.F. stations at home and overseas and on civil aviation stations. Appointments will be in two grades with a maximum of (1) £750 (D 19/48-A) or (2) £1,000 (D 370/50-A) respectively. Commencing salary will be in accordance with age, qualifications and experience. A special allowance of up to £800 a year is payable in addition to salary during overseas service. Candidates must be natural born British subjects. The minimum qualifications and experience required for both grades of post are: (i) (*a*) University degree or equivalent diploma in electrical and/or mechanical engineering and have had at least a two-year apprenticeship, or (*b*) Graduate or Corporate Membership of the Institution of Electrical Engineers, or of the Institution of Mechanical Engineers with appreciable electrical engineering experience, and have served at least a three-year apprenticeship; and (ii) have been employed in a responsible position for a minimum of three years with a well-established engineering concern, and there have gained wide experience in electrical and mechanical engineering practice.

Application forms from Ministry of Labour and National Service, Technical and Scientific Register (K), York House, Kingsway, W.C.2, quoting D19/48-A or D370/50-A. Closing date, June 16, 1951. (K 752)

BRITISH ELECTRICITY AUTHORITY

Yorkshire Division

APPOINTMENT OF POWER STATION SUPERINTENDENT, WHITEHALL ROAD POWER STATION, LEEDS

APPLICATIONS are invited for the appointment of Power Station Superintendent at Whitehall Road Power Station, Leeds.

Applicants should have had a wide experience in the operation and maintenance of large modern power station plant, and have held a position of responsibility involving the control of technical and administrative staff.

Preference will be given to engineers who are Corporate Members of the Institution of Electrical Engineers and/or the Institution of Mechanical Engineers, or who hold the necessary qualifications for membership.

Conditions of service and salary will be in accordance with the National Joint Board Agreement, Schedule "A," Class "E," Grade 1, £935-£977 per annum. The appointment will be subject to the provisions of the Authority's Superannuation Scheme.

Forms of application may be obtained from the Divisional Secretary, British Electricity Authority, Yorkshire Division, British Electricity House, St. Mary's Road, Leeds 7, to whom completed forms should be returned within 14 days of the appearance of this advertisement. Envelopes to be endorsed "Power Station Superintendent, Whitehall Road Power Station, Leeds."

G. A. VOWLES,
Divisional Controller.
(K 747)

SOUTHERN ELECTRICITY BOARD

APPLICATIONS are invited for the following posts:—

FIELD ENGINEER

Construction Department of No. 3 (Portsmouth) Sub-Area, based at Portsmouth or Farnborough. Provisional salary £458 per annum, subject to adjustment. N.J.B. conditions of service.

Candidates should have ability to supervise the erection of 33 kV and 11 kV and l.v. overhead lines, laying and jointing of h.v. and l.v. cables and equipment of 33-11 kV substations.

Applications on forms obtainable from the Sub-Area Secretary, Lower Drayton Lane, Cosham, Portsmouth, and returned to him not later than 10 days after the appearance of this notice.

LADY DEMONSTRATOR

Greenford District of No. 1 (Southall) Sub-Area. Salary N.J.C. Grade 1 (£310 to £390 per annum, plus London Weighting); N.J.C. conditions of service.

Applicants should be qualified to advise generally on the utilisation of electrical appliances, to give cookery demonstrations in showrooms and in the homes of consumers and to assist in showroom duties. The possession of an E.A.W. Certificate or a Domestic Science Diploma would be an advantage.

Applications on forms obtainable from Sub-Area Secretary, 2-6 Windmill Lane, Southall, and returned to him not later than 10 days after the appearance of this notice.

The successful candidates for the above appointments will be required to contribute to the B.E.A. and Area Boards' superannuation scheme if eligible.

F. W. KEMPTON,
Secretary.
(K 784)

BRITISH ELECTRICITY AUTHORITY

Merseyside and North Wales Division

APPLICATIONS are invited for the following vacancies in the Construction Drawing Office at the Divisional Headquarters, Woolton, Liverpool.

SENIOR DRAUGHTSMEN and DRAUGHTSMEN experienced in one or more of the following:—

General layout of power stations.
Turbines and ancillary plant.
Boilers and ancillary plant.
Coal, ash and dust handling plant.
High and low pressure pipework systems.
Power station electrical systems and equipment.
General civil and building work associated with power stations, preferably including some knowledge of architectural treatment.

Candidates should have served a recognised apprenticeship and should be qualified technically up to the standard of Higher National Certificate or equivalent in the case of Senior Draughtsmen, and not less than Ordinary National Certificate in the case of Draughtsmen.

Salaries will be in accordance with experience and qualifications within the provisional ranges of £500-£700 per annum for Senior Draughtsmen and £375-£500 per annum for Draughtsmen. The salary ranges quoted are subject to final negotiations now proceeding with the appropriate organisation.

The appointments will be superannuable under the terms and conditions of the British Electricity Authority and Area Boards' superannuation scheme, and may be subject to a medical examination.

Forms of application may be obtained from the Divisional Secretary, Clarke Gardens, Woolton, Liverpool, and should be returned to him not later than Tuesday, June 12, 1951.

A. R. COOPER,
Divisional Controller.
(K 792)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

SHIFT CHARGE ENGINEER, CHESTERFIELD

APPLICATIONS are invited for the position of Shift Charge Engineer at the Chesterfield generating station.

Applicants should have had a sound training and considerable practical experience in power station operation. The possession of an Ordinary National Certificate in Mechanical or Electrical Engineering or its equivalent would be advantageous.

The salary is in accordance with Class "B," Grade 7, of the National Joint Board Schedule and the applicant will be superannuable under the terms and conditions of the British Electricity Authority and Area Boards' superannuation scheme.

Applications should be submitted on the official form, which may be obtained from the Divisional Establishment Officer, British Electricity House, Barker Gate, Nottingham, and should be delivered to the undersigned not later than June 15, 1951.

W. S. BURGE,
Divisional Controller.
(K 793)

BRITISH ELECTRICITY AUTHORITY

Yorkshire Division

APPLICATIONS are invited for an appointment as SENIOR DRAUGHTSMAN (Civil) in the Generation (construction) Department, Northern Group, Leeds.

The salary, which should be regarded as provisional pending negotiations with such organisations as are appropriate, will be within the range £500 to £700 per annum, according to qualifications and experience.

Duties will be largely concerned with the preparation and checking of drawings of layouts, civil engineering and building works, required for power stations under construction or in the project stages, and for alterations and extensions to existing power stations.

Applicants should have had experience in one or more of the following:—

(1) Layout of power stations.
(2) Surveying of sites.
(3) Design of reinforced concrete foundations and structures.
(4) Design of large buildings and structures.

Experience in the preparation of specifications and bills of quantities will be an added qualification.

The appointment will be subject to the provisions of the Authority's Superannuation Scheme.

Forms of application may be obtained from the Divisional Secretary, British Electricity Authority, Yorkshire Division, British Electricity House, St. Mary's Road, Leeds 7, to whom completed forms should be returned within 14 days of the appearance of this notice. Envelopes to be endorsed: "Senior Draughtsman (Civil)".

G. A. VOWLES,
Divisional Controller.
(K 732)

BRITISH ELECTRICITY AUTHORITY

ASSISTANT PURCHASING OFFICER

APPLICATIONS are invited for the post of Assistant to the Divisional Purchasing Officer at these Headquarters. Applicants should have considerable experience of buying maintenance supplies, electrical and general engineering equipment as required for generating stations and transmission sections, together with a sound knowledge of internal purchasing procedure including trade inquiries, records, follow up and the organisation of stores.

The salary will be in accordance with Grade 4 of the National Joint Council Agreement (£510 to £570 per annum).

The post will be superannuable within the provisions of the B.E.A. and Area Boards' Superannuation Scheme.

Applications should be submitted on the official form which may be obtained from the Divisional Establishments Officer, B.E.A., Barker Gate, Nottingham, and should be returned not later than June 13, 1951.

W. S. BURGE,
Divisional Controller.
(K 799)

NOTTINGHAMSHIRE COUNTY COUNCIL

County Architect's Department

APPLICATIONS are invited for the superannuable appointments of two ELECTRICAL ENGINEERING ASSISTANTS, namely, one in Grade "V"(a) (£600 x £20 p.a.-£660) and one in Grade "V" (£570 x £15 p.a.-£620).

Applicants must be capable draughtsmen with experience in the preparation of schemes, specifications and estimates for all classes of electrical installation work, and must be Graduate Members of the Institution of Electrical Engineers.

Application forms and further particulars are obtainable from the County Architect, County Hall, Trent Bridge, Nottingham, to whom completed applications must be returned by June 9, 1951. Canvassing will disqualify.

K. TWEEDALE MEABY,
Clerk of the County Council.
(K 746)

BRITISH ELECTRICITY AUTHORITY

Merseyside and North Wales Division

APPLICATIONS are invited for the appointment of JUNIOR ENGINEER in the Control Room at Percival Lane Power Station, Runcorn. Salary £412/£428, Class "G," Grade 14, of the N.J.B. Agreement.

Candidates should have experience in power station practice. A knowledge of control room duties is desirable and possession of the Higher National Certificate in Electrical Engineering or equivalent qualification would be an advantage.

The appointment will be superannuable under the terms and conditions of the British Electricity Authority and Area Boards' superannuation scheme, and may be subject to a medical examination.

Forms of application may be obtained from the Divisional Secretary, Clarke Gardens, Woolton, Liverpool, and returned to him not later than Saturday, June 9, 1951.
(K 780)

BRITISH ELECTRICITY AUTHORITY

Eastern Division

APPLICATIONS are invited for the following appointment:—

SECOND ASSISTANT ENGINEER (Testing and Efficiency)—Little Barford Generating Station.

Salary in accordance with the N.J.B. Schedule, Grade 11, Class "C" (£506-£528 per annum), but will be subject to negotiation.

Applicants should possess the Higher National Certificate in mechanical and/or electrical engineering or other equivalent qualifications and have had previous experience in a large generating station.

A knowledge of instrument maintenance and calibration is desirable and preference will be given to candidates who have had experience in p.f. equipment.

The successful applicant will be required to assist in ensuring that all sections of the generating station plant attain efficiency and economy of operation, the preparation of statistics and the keeping of technical records.

The appointment will be superannuable in accordance with the British Electricity Authority and Area Boards' Superannuation Scheme.

Applications, stating age, experience and present position, should be sent to the Divisional Controller, British Electricity Authority, Eastern Division, Northmet House, Southgate, N.14, to arrive not later than June 1, 1951. Envelopes should be endorsed "Second Assistant Engineer (Testing and Efficiency—Little Barford."

W. N. C. CLINCH,
Controller.

Northmet House,
Southgate, N.14.
(K 753)

BRITISH ELECTRICITY AUTHORITY

SHIFT CHARGE ENGINEER at Canterbury Power Station. Applicants should have had suitable training and experience in the operation of power station plant and e.h.t. switchgear.

N.J.B. conditions of service and salary Class "B," Grade 7, £492 p.a. Position superannuable.

Applications on forms obtainable from Divisional Secretary, B.E.A., S.E. Division, Lower Ham Road, Kingston-upon-Thames, to arrive not later than June 2, 1951.
(K 744)

SOUTH WESTERN ELECTRICITY BOARD

VACANCIES exist for TWO DEMONSTRATORS: (i) in the Exeter District and (ii) in the West Devon District of the Devon Sub-Area. Salary within Grade 1 (£310 by £20 to £390) of the N.J.C. Salary Agreement.

Preference will be given to candidates possessing a recognised domestic science qualification.

Applications, stating age, present position and salary, qualifications and experience, should reach (i) The District Manager, 46 North Street, Exeter, and (ii) The District Manager, 20 High Street, Bideford, within 10 days. (K 798)

ASCO Ltd., are prepared to appoint SALES AGENTS for commercial refrigeration equipment in selected territories.—Asco Ltd., Refrigeration Division, Broadheath, nr. Manchester. (K 737)

COMPETENT mechanical and/or electrical engineering DRAUGHTSMEN required for design work in connection with a cyclotron being constructed for cancer research. Salary in accordance with age and experience. —Apply, in writing, giving full details of qualifications and previous appointments and including references, to the Senior Cyclotron Engineer, M.R.C. Cyclotron Section, P.O.W. Camp, Scrubs Lane, London, W.12, quoting reference ET. (K 765)

COMPETENT TRANSFORMER TEST ENGINEER required. Duties include the testing of all types of power transformers to 2,000 kVA., preparation of test certificates and general physical inspection of transformers.—Applicants should be to H.N.C. standard and have had previous transformer test experience. State experience and salary to Lindley Thompson Transformers, St. Mary's Road, Slough. (K 782)

CONTRACTS ENGINEER for H.T. and L.T. switchgear and transformer tenders and contracts. House available if required within short period.—Apply, stating technical qualifications, experience and salary required, to Personnel Manager, South Wales Switchgear, Ltd., Blackwood, Mon. (K 696)

DRAUGHTSMEN wanted by makers of industrial electrical control gear. London area.—Full details, experience, age, salary, to Box No. 6047, Electrical Times. (K 717)

BOX No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London W.C.2

DRAUGHTSMAN/DESIGNER with mech. and/or elec. experience for interesting development work. Valuable opportunity for young man to specialise with a company of international repute in the lighting industry. Excellent working conditions, 5-day week, canteen, social club.—Write fully, stating age, experience and salary required, to Box No. 6061, Electrical Times. (K 760)

DRAUGHTSMAN, with experience of transformer manufacture, required by electrical engineering company in north-east London. Permanent position with superannuation scheme for suitable applicant. Good salary and working conditions.—Write, stating age, experience and salary required, to Box No. 6065, Electrical Times. (K 772)

DRAUGHTSMEN AND ENGINEER DESIGNERS required, experienced in the layout of electrical switch and control boards, diagrams of connections or electrical control gear. Good remuneration for men of first class experience.—Apply, quoting "Switchgear", to Staff Manager, General Electric Co., Ltd., Witton, Birmingham 6. (K 699)

DRAUGHTSMEN, 20/30, with good basic training required for power-transformer work by established British company with expanding activity in Middlesex. Bonus and pension schemes.—Write, age, experience, qualifications and salary required, to Box No. 6059, Electrical Times. (K 759)

ELECTRICAL DRAUGHTSMAN, familiar with light mechanisms or instruments and preferably with some circuit experience, required by Dowty Equipment, Ltd., Arle Court, Cheltenham, for their electrical development department. Age 21-25. Higher National Certificate preferred. The factory is ideally situated in the grounds of a country house and working conditions are excellent. —Write to Personnel Manager, stating age, experience and salary required. (K 564)

ELECTRICAL ENGINEER DRAUGHTSMAN required with experience in the design and installation of power and lighting schemes, distribution and control diagrams, etc. Excellent prospects for suitable men offered by Tees-side firm.—Apply, giving full particulars, quoting reference F.D., to Box No. 6027, Electrical Times. (K 658)

ELECTRICAL ENGINEER, aged 20-25, preferably with Higher National Certificate, required to train as Estimating Engineer. Preference given to applicants familiar with contactor type starters.—Apply to Personnel Officer, J. A. Crabtree and Co., Ltd., Lincoln Works, Walsall. (K 780)

ELECTRICAL ENGINEERS, age 26 to 33 years, with qualifications of Higher National Certificate standard and experience in manufacture, repairs and maintenance of electrical plant, are required as Inspecting Engineers in areas Manchester, Wigan, Birmingham, London, Middlesbrough and other districts. Progressive salary commencing £520, rising to £750 per annum, with non-contributory pension. Contributory widows' and orphans' scheme. —Apply, in own handwriting, stating age, qualifications, experience and whether married or single, by letter marked "Electrical Inspector," to Chief Engineer and General Manager, The National Boiler and General Insurance Co., Ltd., St. Mary's Parsonage, Manchester 3. (K 770)

ELECTRICAL SUPERVISOR required for maintenance department on production plant. Must be experienced in operation and maintenance of industrial installations, including the following units: 6·6 kV switchgear and motors, rectifiers, storage, battery and charging plant, together with M.V. installation totalling 3,000 kVA. Salary £600 p.a.—Full particulars, including qualifications and age, to be forwarded to the Works Manager, Philblack Ltd., Avonmouth Docks Estate, Avonmouth. (K 769)

FERRANTI LIMITED invite applications for senior appointments of Graduate Engineers with industrial experience in electrical measurements, particularly in electrical integrating energy metering both industrial and commercial, together with knowledge of testing equipment and facilities. The posts to be filled carry senior responsibility with excellent prospects, generous salary and pension.—Application forms from Mr. R. J. Hebbert, Staff Manager, Ferranti Limited, Hollinwood, Lancs. Please quote reference M.E. (K 744)

FIRST-CLASS PLANNING AND METHODS ENGINEER required to apply most modern assembly methods to manufacture of small electro-mechanical products. West London area.—Write, giving age, full details of experience and salary required to Box No. 6051, Electrical Times. (K 719)

JUNIOR ENGINEERS and LABORATORY ASSISTANTS required for the development of instruments, meters and relays. University Degree or Higher National Certificate standard required.—Apply, in writing, stating age, experience and salary required, marking envelopes "Meter," to Personnel Manager, Metropolitan-Vickers Electrical Co., Ltd., Trafford Park, Manchester 17. (K 698)

ILFORD Limited Engineering Research and Development Department have vacancies for DRAUGHTSMEN in the following categories: (1) ELECTRICAL. Drawing office and workshop experience of power and lighting layouts is essential. (2) SERVICES. Experience in practical schemes for boiler plant, refrigeration and air conditioning is necessary. (3) MECHANICAL DESIGN. A wide experience with mechanisms of all types is required. Permanent and well-paid positions in good working conditions will be offered to competent men.—Write fully to Ilford Limited, P.O. Box No. 10, Romford, Essex. (K 768)

LAMP WORKS FOREMEN. Expanding production requirements have created several vacancies in well-established lamp works in the north. Only men with good practical experience of modern lamp-making machines and techniques and ability to train and supervise flame setters, etc., should apply. Superannuation fund and full welfare, social and sports facilities are available, and housing assistance may be given if required. —Applications, with full details of experience, etc., to Box No. 6073, Electrical Times. (K 776)

MALES required as TESTERS on electrical measuring instruments. Experience desired, but not essential. Good opportunities for young men with National Certificate or equivalent. Write for interview, state age and previous experience, Sangamo Weston Ltd., Cambridge Road, Enfield, Middlesex. (K 682)

PROFESSIONAL HELP REQUIRED by leading Correspondence School to prepare a course of study in Refrigeration.—Apply, giving full details of qualifications and experience, to Box No. 6071, Electrical Times. (K 775)

QUALIFIED ELECTRONIC ENGINEER is urgently required for the test and development departments of well-known automobile manufacturing company. Applicants should at least hold a H.N. Certificate Electrical Engineering and preferably a degree, also should have had some previous experience in the practical aspects of this type of work. Salary according to age, experience, and qualifications, with sound prospects.—Apply, Box No. 6043, Electrical Times. (K 715)

REQUIRED FOR MIDDLE EAST. All-round ELECTRICIANS, with experience in conduit and general electrical installation work, able to read drawings. A knowledge of cable and switchgear erection and overhead work would be useful.

(b) First-class PLUMBER JOINTERS with experience in jointing paper-insulated, lead-covered, and armoured cables up to 11 kV.

Free passage out and return, free quarters, messing, and medical attention. Leave granted and monthly salary. Apply, stating age and experience. Forward copies of testimonials or state names to whom we may apply.—Reply to Box No. 6049, Electrical Times. (K 718)

SALES REPRESENTATIVE required for the London Area by Siemens Electric Lamps and Supplies, Ltd. Progressive position for keen and energetic man.—Write, stating age and full details of experience, to 38-39 Upper Thames Street, London E.C.4. (K 778)

SENIOR DESIGNER-DEVELOPMENT ENGINEER for domestic and light industrial electro-mechanical control devices. Only men of proved experience and success in most modern practice need apply. First class opportunities for advancement.—Fullest particulars of qualifications, career to date and salary required, in confidence, to Box No. 6057, Electrical Times. (K 739)

SITE ENGINEER. Experienced plant installation, supervision of plant foundations, buildings, services, etc., for expansion scheme.—Apply, giving age, experience, salary required, etc., to Box No. 5085, Electrical Times. (K 523)

SKILLED ELECTRICIANS wanted with overhead electric crane and steelworks machinery experience. Willing to travel U.K.—Apply: The Wellman, Smith, Owen Engineering Corporation Ltd., Darlaston, South Staffs. (K 781)

TECHNICAL ASSISTANT (Electrical) required for Central London office for the design and layout of factory electrification, power and lighting. Applicants should be between 25 and 30 years of age and must hold the H.N. Certificate in electrical engineering. Information on all experience including practical work to be given. Salary according to experience. Superannuation. Appointment subject to medical examination.—All applications, which will be treated in confidence, should be addressed to Office Manager, Unilever House, Blackfriars, E.C.4. (K 771)

THE Brush Electrical Engineering Co., Ltd., has a vacancy for a DESIGN ENGINEER conversant with a.c. and d.c. motor control gear. Good experience of practical design and development on industrial or traction equipment is essential, with ability to initiate new designs. A Designer Draughtsman is also required to deal with similar work. Excellent opportunities for advancement are available.—Write, with full details of age, experience and salary required, to The Technical Director, The Brush Electrical Engineering Co., Ltd., Loughborough, Leics. (K 766)

TECHNICAL LABORATORY ASSISTANTS with some experience preferably in the electronic experimental field are required by the Research Laboratories of The General Electric Co. Ltd., East Lane, North Wembley, Middlesex. Good education essential; beyond Matriculation standard desirable.—Apply, in writing, to the Personnel Officer (ref. GBLC/90) quoting age and record. (K 633)

TESTERS, skilled, for electric motors required. Must be experienced all types electric motors, a.c. and d.c., up to 15-20 h.p.—Apply in person: Personnel Dept., Lancashire Dynamo and Crypto, Acton Lane, Harlesden, N.W.10. (K 779)

THE HEAD WRIGHTSON MACHINE CO., LTD., require a fully qualified ELECTRICAL ENGINEER capable of preparing specifications and superintending the installation and starting-up of modern rolling mill and auxiliary machinery. Applications, stating age, experience and salary required, to be addressed to The Director and General Manager, The Head Wrightson Machine Co., Ltd., Commercial Street, Middlesbrough, marked "Private and Confidential." (K 651)

TRANSFORMER DESIGNER with experience in distribution transformers up to 1,000 kVA required in Merseyside district. Good facilities for housing experienced man.—Please write, giving full details and quoting Ref. GBE, to Box No. 6067, Electrical Times. (K 773)

TRANSFORMER TECHNICAL ENGINEER required with particular experience in small h.v. transformers and testing equipment. Must be up to Higher National Certificate standard or equivalent.—Apply, giving details of previous experience, Personnel Officer, Foster Transformers & Switchgear Ltd., South Wimbledon. (K 631)

WANTED by firm of Electrical Contractors COST CLERK, age over 25. Would consider disabled ex-service man. Salary in accordance with experience.—Apply, Box No. 6045, Electrical Times. (K 716)

YOUNG graduate MECHANICAL OR ELECTRICAL ENGINEER wanted on Merseyside for development work on all aspects of domestic refrigerators. Good facilities for housing qualified applicant.—Please write, giving full details and quoting Ref. GCA, to Box No. 6069, Electrical Times. (K 774)

APPOINTMENTS WANTED

A.M.I.E.E., 35, REQUIRES CHANGE. Wide industrial and sales experience. Suitable sales manager, works liasion, technical representative or similar responsible position.—Box No. 6075, Electrical Times. (K 802)

WORK WANTED

A.C. and d.c. Motor Rewinds and Repairs. Prompt service, fully guaranteed.—Edgware 8631 (4 lines), Service Electric Co. Ltd., Stanmore, Middx. (D 324)

ARMATURE SERVICE CO. LTD., Haddington Street, Hove (Tel.: 32996), electrical engineers and winding specialists. Distance no object. (F 739)

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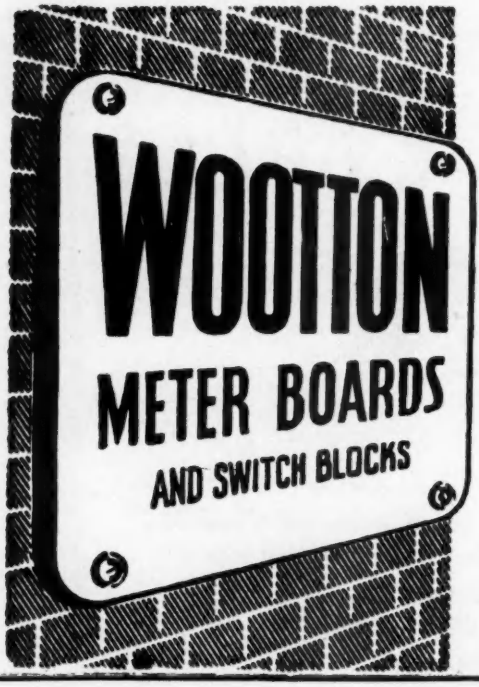

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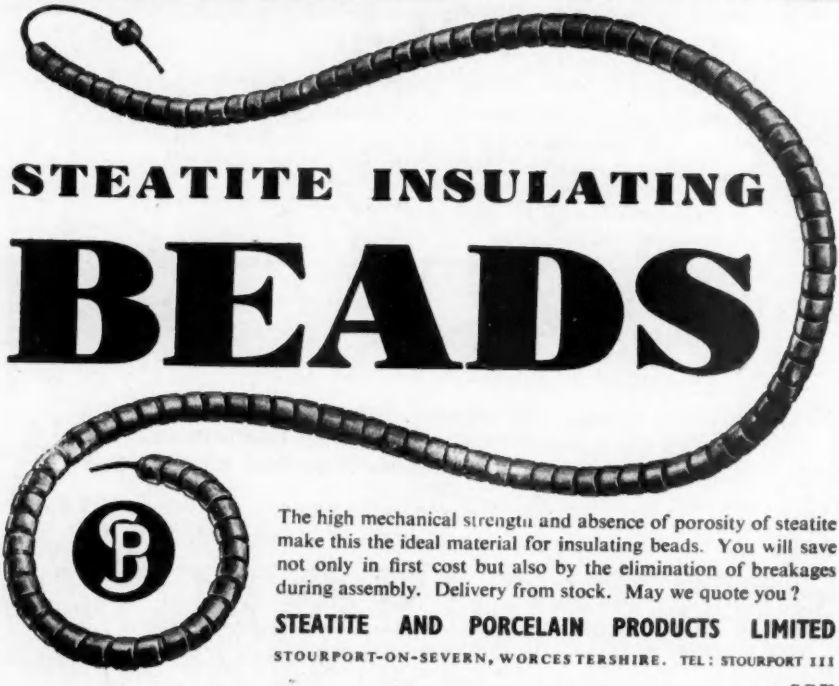

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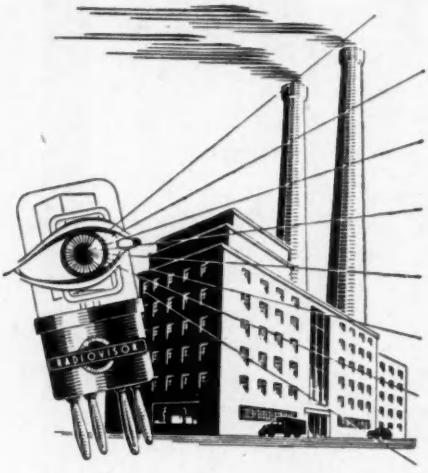

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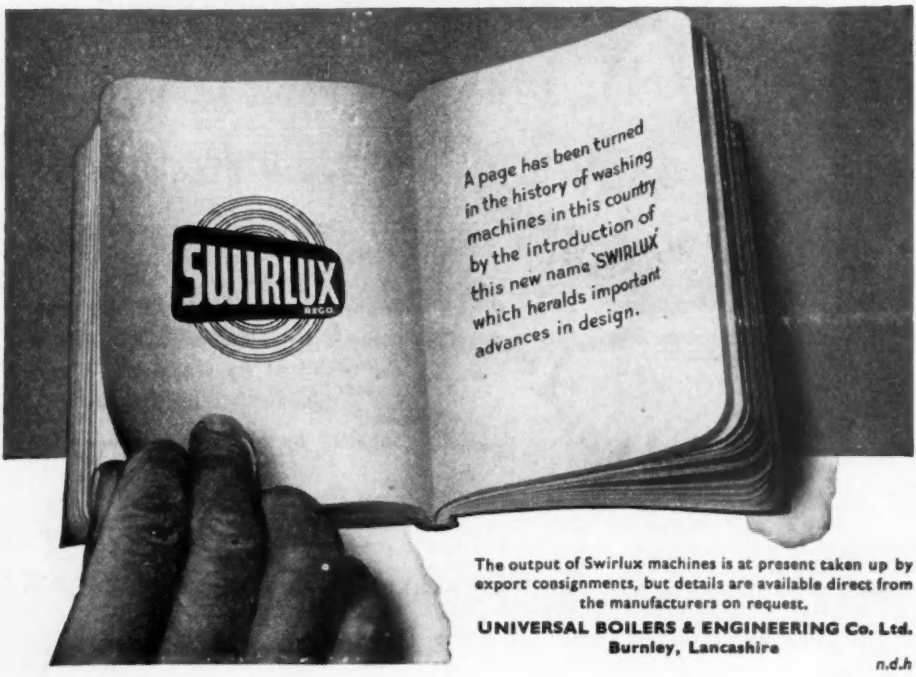
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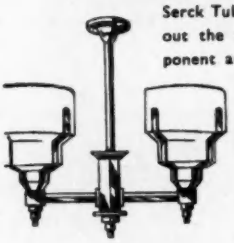

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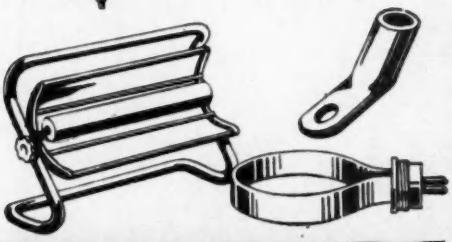

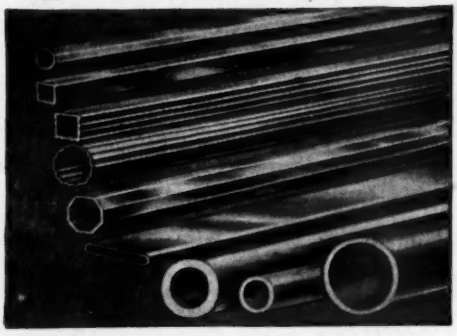

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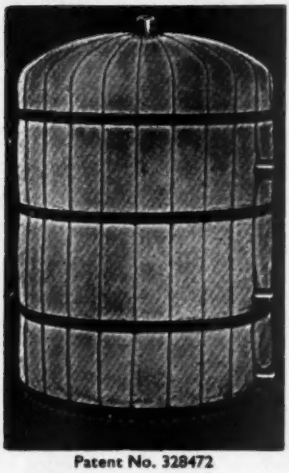

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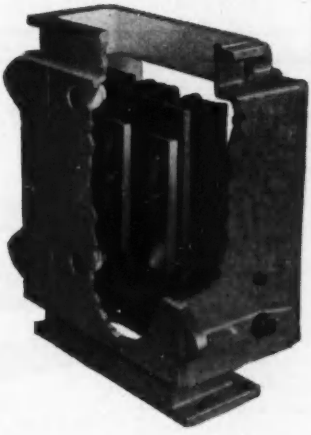

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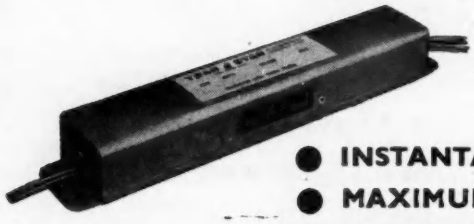

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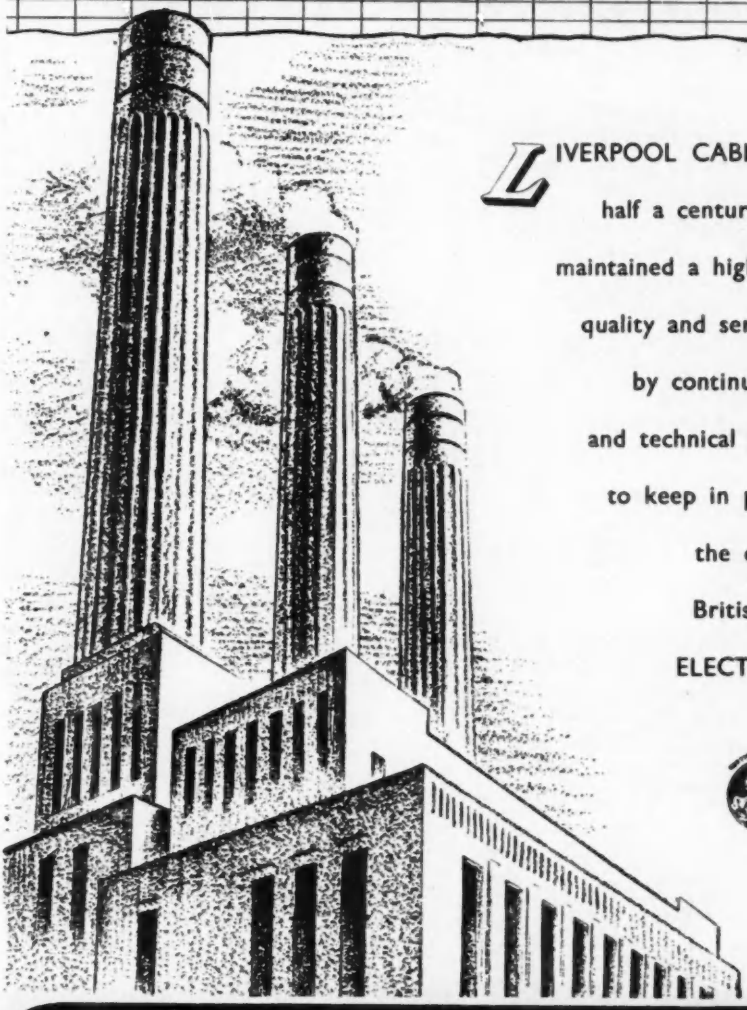

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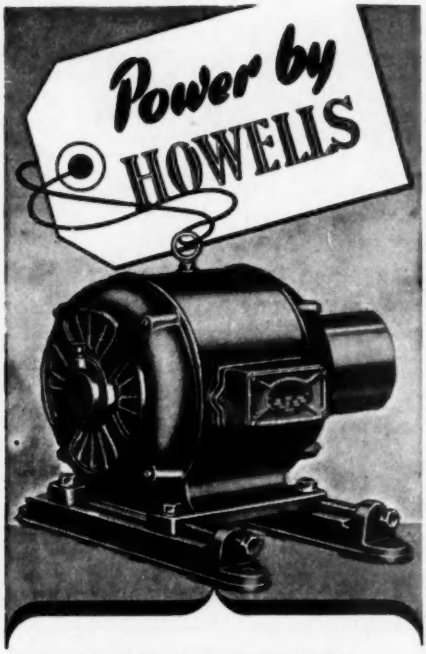

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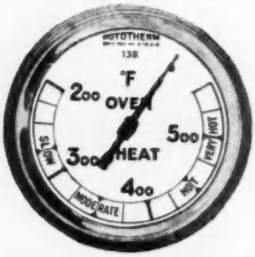

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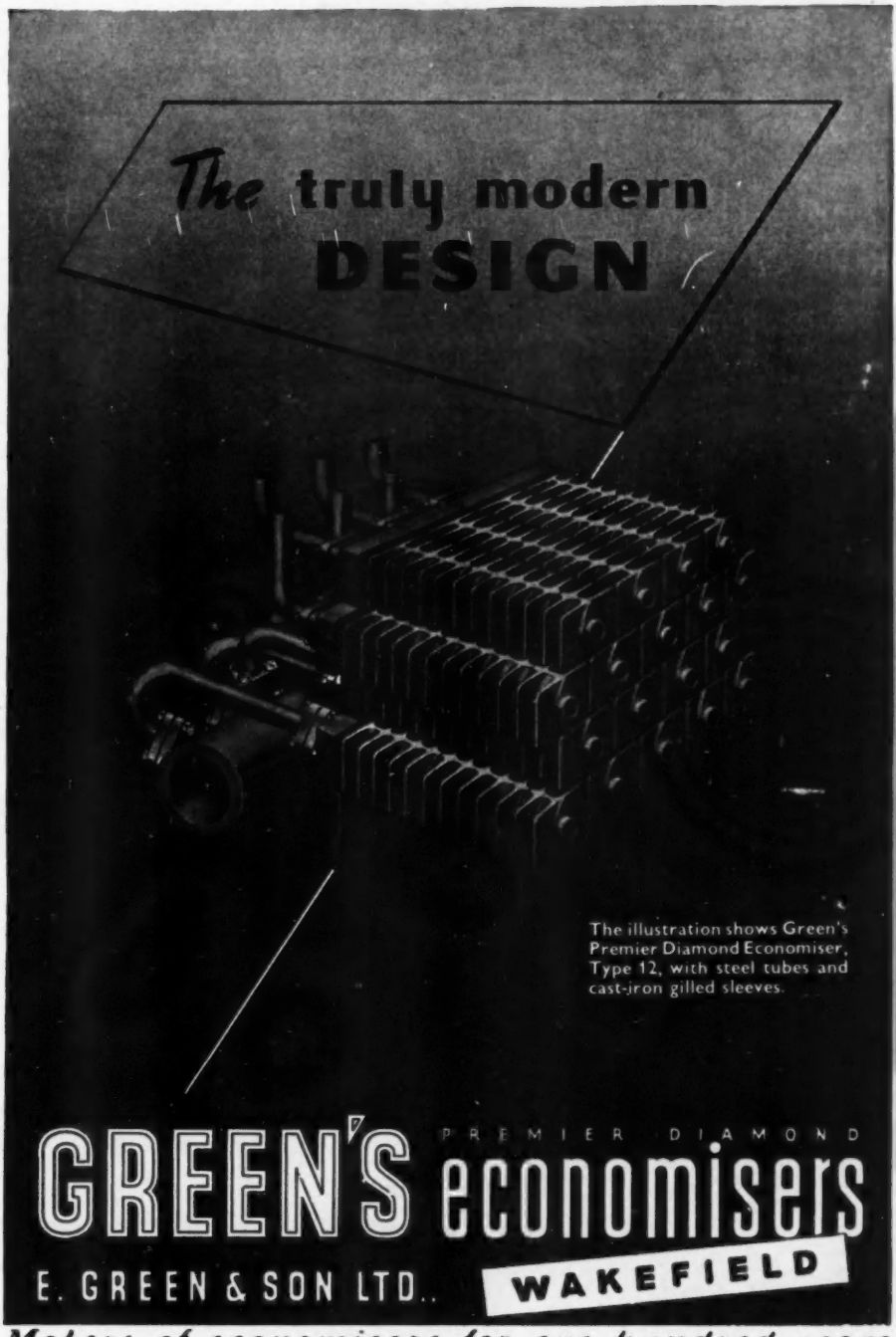
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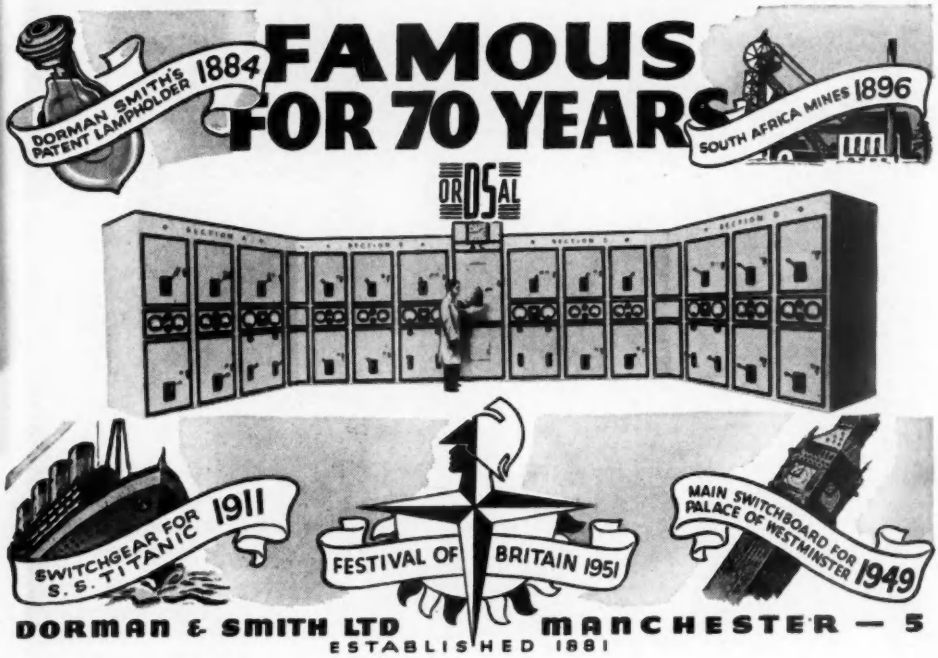
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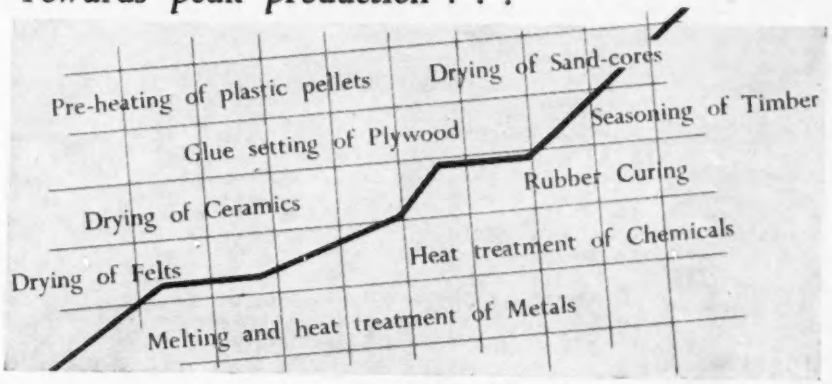

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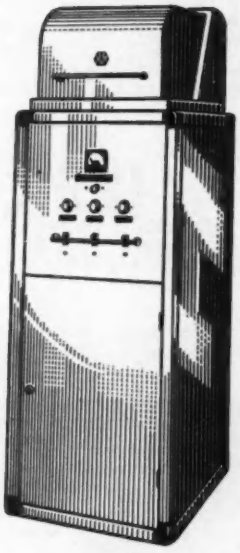

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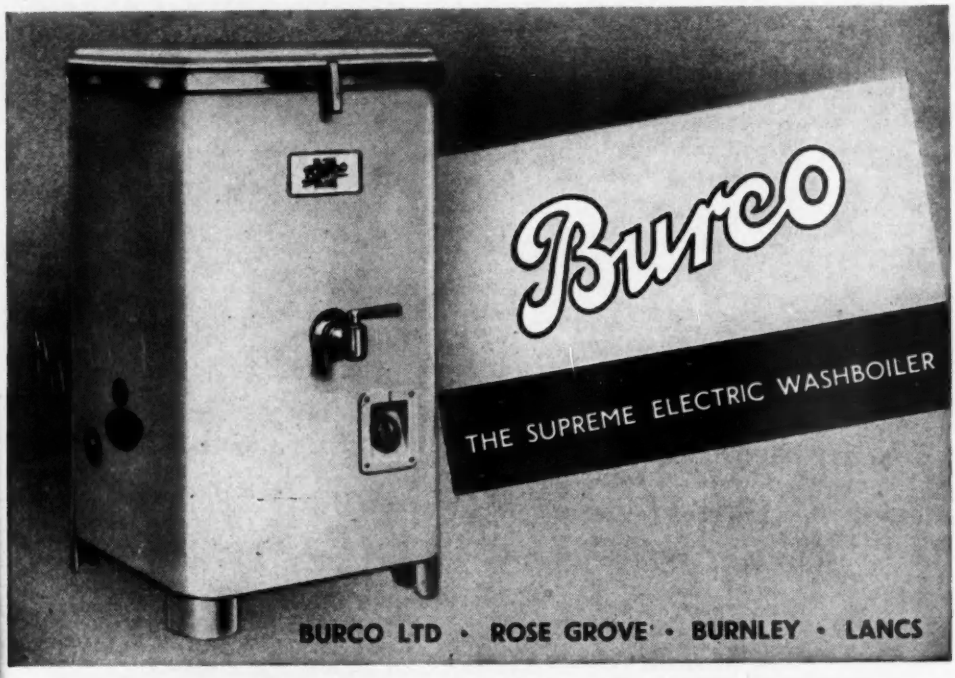

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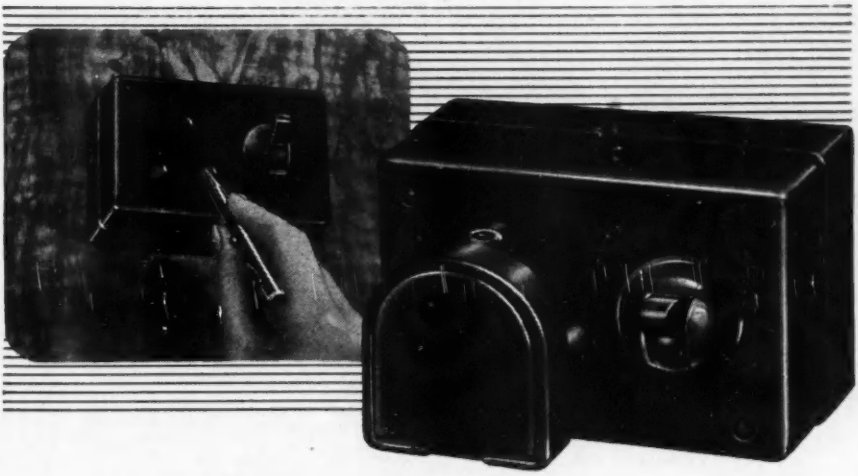

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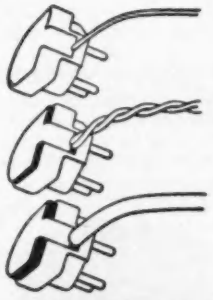

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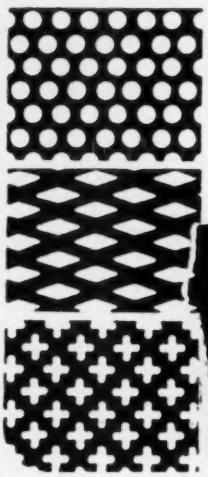

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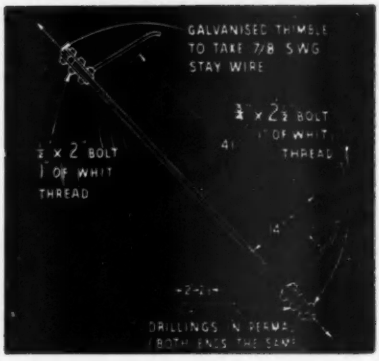

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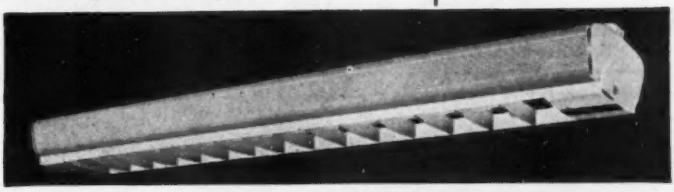

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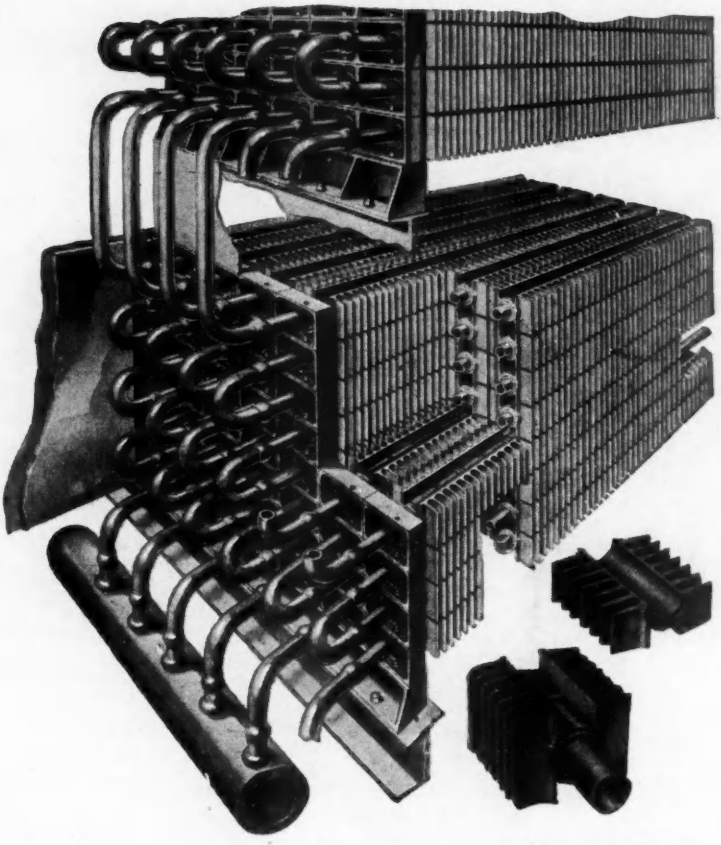

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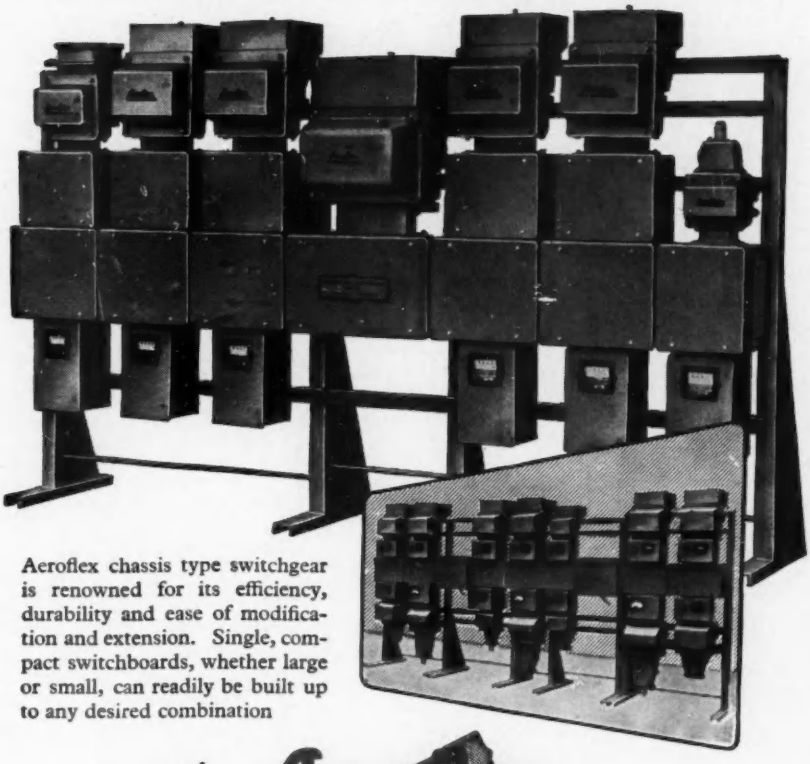

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